Service-Manual

VCR

1995

NOKIA	VCR 3706 NE
	VCR 3706 CE
	VCR 3706 SE
	VCR 3716 NE
	VCR 3716 CE
	VCR 3716 I
	VCR 3716 EP
	VCR 3716 UK
LUXOR	VCR 4706 NE
FINLUX	VCR 7156 NE

Circuit diagrams, P.C.B., spare parts list, electrical alignment, mechanical adjustments

Safety Component!

! This symbol identifies in the circuit diagrams all safety critical parts. Replace only with specified part numbers.

Service and repair work to be performed only in accordance with existing safety regulations!

NOKIA

CONNECTING PEOPLE

6611 9038

PRECAUTIONS IN PART REPLACEMENT

When servicing the unit with power on, be careful with the section marked white all over. This is the primary power circuit which is live.

When checking the soldering side in the tape travel mode, make sure first that the tape has been loaded and then turn over the PWB with due care to the primary power circuit.

Make readjustment, if needed after replacement of part, with the mechanism and its PWB in position in the main frame.

(1) Start and end sensors: Q851 and Q852

Insert the sensor's projection deep into the upper hole of the holder. Referring to the PWB, fix the sensors tight enough.

(2) Photocoupler: IC901

Refer to the symbol on the PWB and the anode marking of the part.

(3) Cam switches A and B: D852 and D853

Adjust the notch of the part to the white marker of the symbol on the PWB. Do not allow any looseness.

(4) Take-up and supply sensors: D855 and D854

Be careful not to confuse the setting direction of the parts in reference to the symbols on the PWB. Do not allow any looseness.

(5) Diode bridge: D901

Adjust the + marking of the part to the symbol's cathode marking on the PWB.

1. SPECIFICATIONS

Format:	VHS PAL standard
Video recording system:	Two rotary heads, helical scan system
Video signal:	PAL/MESECAM colour and B/G signals, 625 lines
Recording/playing time:	260 min max. with E-260 tape (SP) 520 min max. with E-260 tape (LP)
Tape width:	12.7mm
Tape speed:	23.39 mm/s (SP) 11.70 mm/s (LP)
Antenna:	75 ohm unbalanced
Receiving channel:	VHF Channel S1-S41, E2-E12 UHF Channel E21-E69
RF converter output signal:	UHF Channel E30-E39 (preset to CH E36)
Power requirement:	AC230V, 50Hz
Power consumption:	Approx. 17 W or 19W (LP4 head models)
Operating temperature:	5°C to 40°C
Storage temperature:	–20°C to 60°C
Weight:	Approx. 3.5 kg
Dimensions:	380 mm (W) x 290.3 mm (D) x 91.8 mm (H)
VIDEO	
Input:	1.0 Vp-p, 75 ohm
Output:	1.0 Vp-p, 75 ohm
S/N ratio:	45 dB
Horizontal resolution:	250 lines
AUDIO	0 dBs = 0.775 Vrms
Input:	Line: –3.8 dB, 47k ohm
Output:	Line: –3.8 dB, 1k ohm
S/N ratio:	42 dB
Frequency responce:	80 Hz ~ 10 kHz
Accessories included:	75 ohm coaxial cable Operation manual Infrared remote control Battery (2pcs.)

As part of our policy of continuous improvement, we reserve the right to alter design and specifications without notice.

Note: The antenna must correspond to the new standard DIN 45325 (IEC 169 - 2) for combined UHF/VHF antenna with 75 ohm connector.

PRECAUTIONS IN SERVICING

1. Mounting the PWBs

(1) Hand-inserted parts

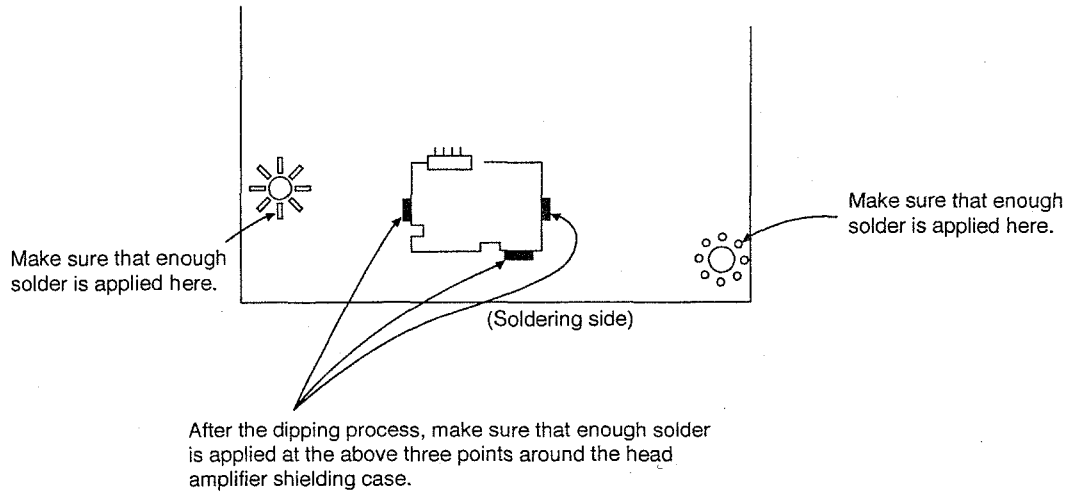
Make sure that the tuner, RCA jack, 21-pin socket, plug socket, remote control receiver, shielding case, switches, mechanism sensors and other hand-inserted parts are tight in position.

① The general safety instructions are issued by Safety Group. Follow the "Safety Precautions". Also be sure that the primary-power capacitors C905, C906 and C915 (parts depending on models) are tight enough in place.

② Handle the sensors and switches (start sensor, end sensor, cam switch, reel sensor, and record tip sensor) with care.

(2) Soldered parts

① The board-to-board connector "AO", RCA jack and some other parts are soldered in position.


Make sure that enough solder is applied here.
Make sure that enough solder is applied here.
(Soldering side)
After the dipping process, make sure that enough solder is applied at the above three points around the head amplifier shielding case.

(3) Coaxial cables

Connect the cable's L-shaped end to the tuner and the straight end to the converter.

2. Assembling the chassis

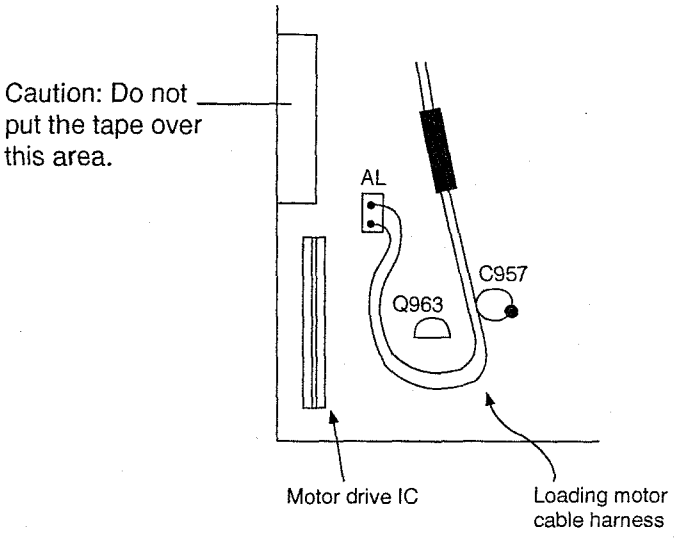
(1) Dressing the cables

① Be careful not to connect the flexible flat cables upside down. Their sockets are in special shape.

② Install the harnesses with care not to get caught by the frame and the mechanism (cassette controller).

③ Make sure that all the harnesses are tight in position.

④ Shape the loading motor cable harness as shown over.



(2) Mounting the mechanism

* Set up the mechanism with care to the sensors and the record tip switch. Keep the sensors free of dust, grease, etc.
* Install the capstan motor with correct connections between the circuit boards.

(3) Tightening the screws

Follow the instructions from Mechanism Group.

2. DISASSEMBLY AND REASSEMBLY

2-1 DISASSEMBLY OF MAJOR BLOCKS

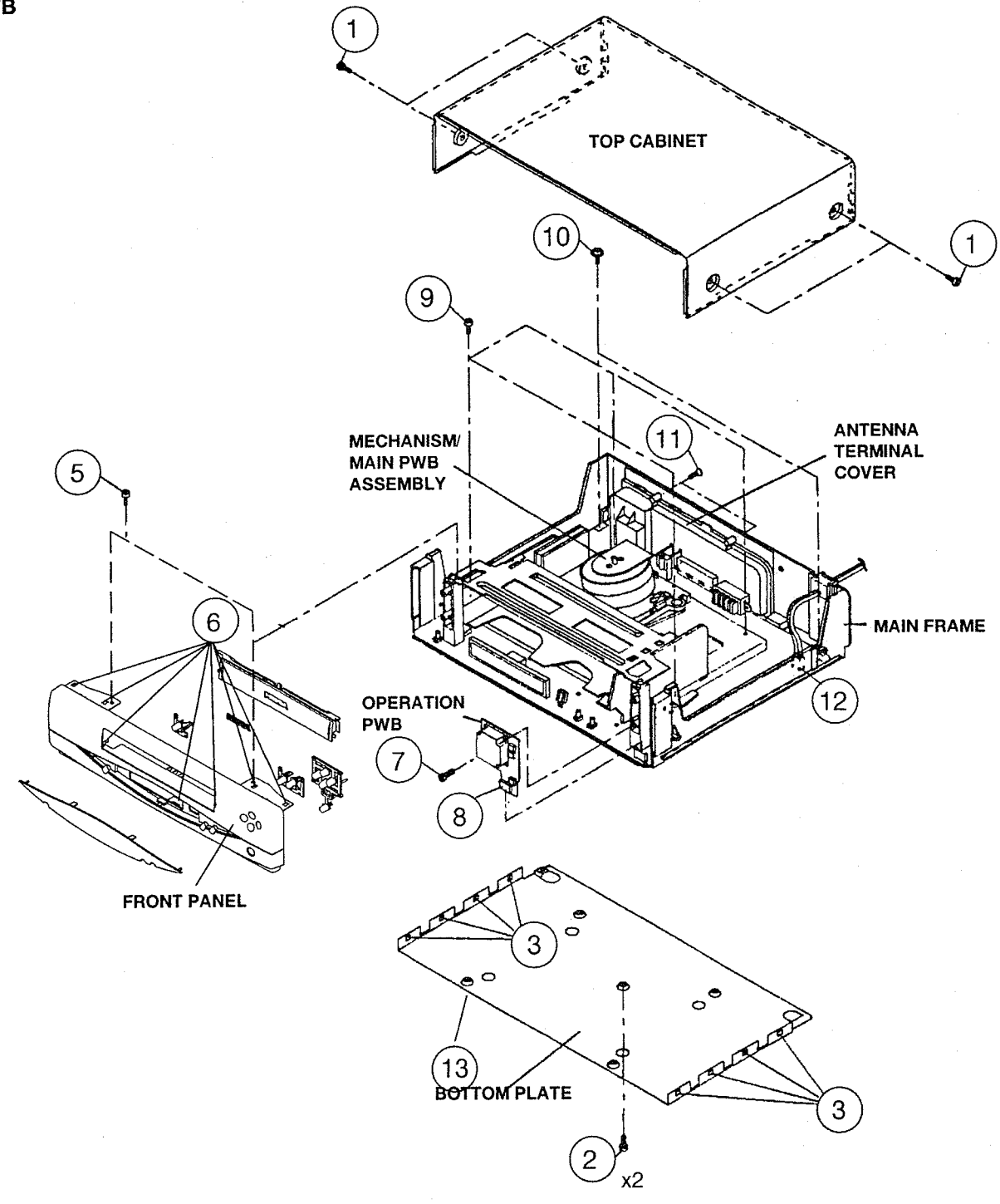
TOP CABINET : Remove 4 screws①

BOTTOM PLATE : Remove 2 screw②and 8 hooks ③

FRONT PANEL Remove 2 screws⑤and 7 clips 6.

OPERATION (SHUTTLE JOG) PWB : Remove 1 screw⑦ Take it out of connector⑧

MECHANISM/ MAIN PWB ASSEMBLY : Remove 4 screws⑨ 2 screws ⑩ and 1 underneath ⑬ 2 screws⑪ and 1 connector ⑫ Lift the antenna terminal cover and take the assembly out of the main frame.



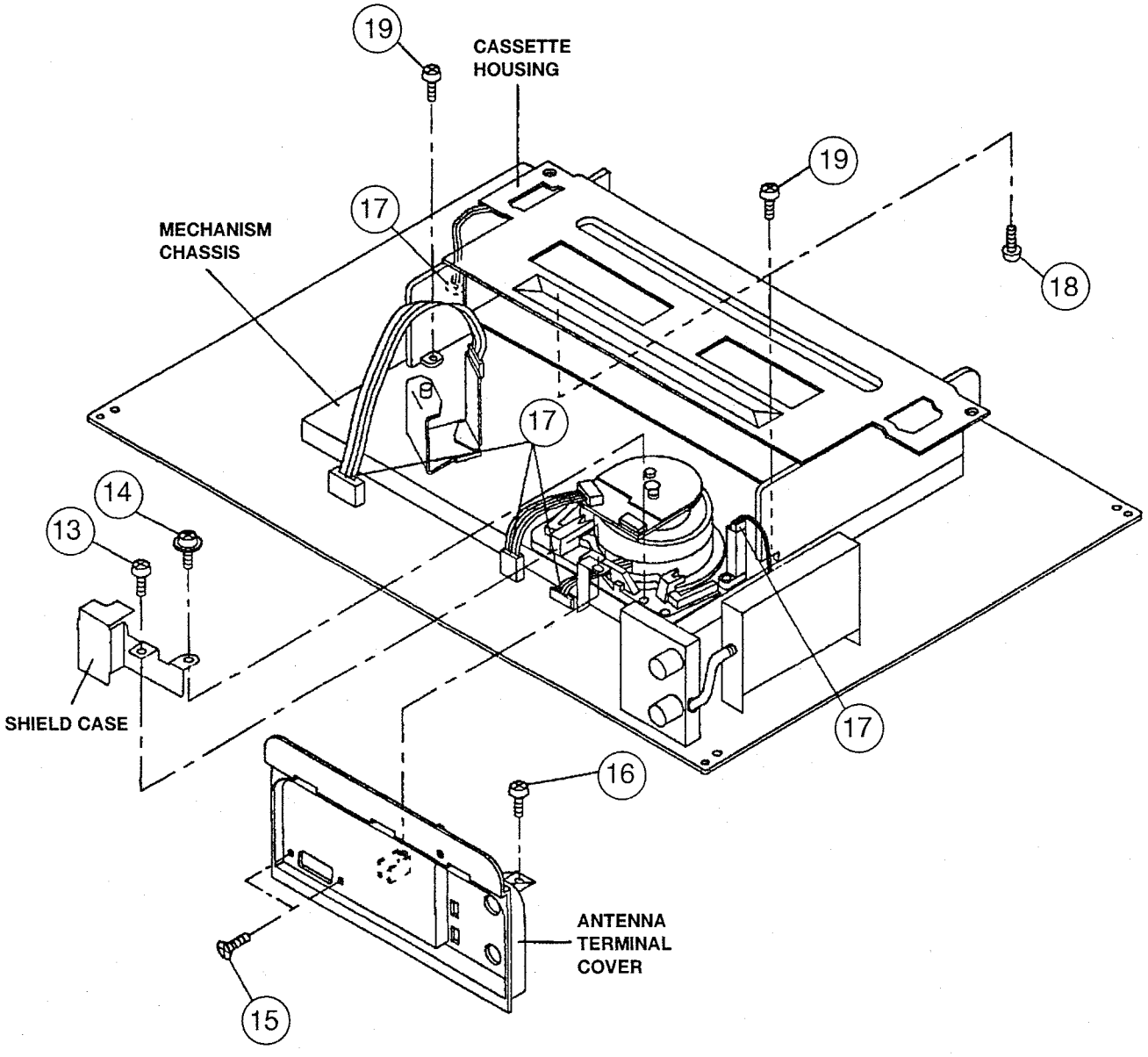
2-2 DISASSEMBLING THE MECHANISM/MAIN PWB ASSEMBLY

SHIELD CASE : Remove 1 screw ⑬ and 1 screw ⑭.

ANTENNA TERMIANAL COVER : Remove 2 screws ⑮ and 1 screw ⑯.

MECHANISM CHASSIS/ CASSETTE HOUSING ASSEMBLY : Remove 3 FFCs and 2 harnesses ⑰.
: Be careful not to confuse the top and bottom of the FFC.
Remove 1 screw ⑱ from behind the main PWB.
Lift the mechanism chassis/cassette housing assembly vertically to take it out of the main PWB.

CASSETTE HOUSING : Remove 2 screws ⑲.



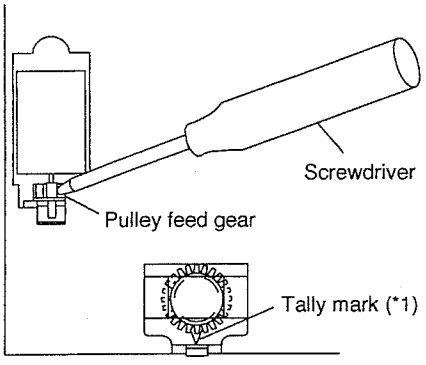
2-3 PRECAUTIONS IN REASSEMBLING

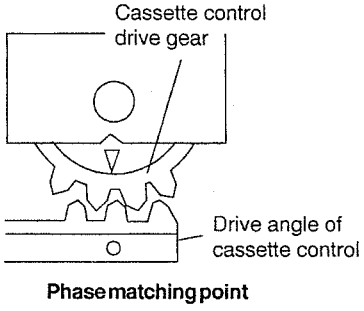
MOUNTING THE CASSETTE CONTROLLER

Initial setting is indispensable before placing the cassette controller in the mechanism. The initial setting is made in two ways; electrical and mechanical.

Electrical setting:

Make a connection between TP5001 and TP5002, both located at the center on your side on main PWB, with a 22 ohm resistor and be sure that the mechanism is back to its initial setting position (*1). Now place the cassette controller in position. (This method is used when the mechanism has been already set on its PWB.)





Mechanical setting:

Turn the loading motor's pulley feed gear using a screwdriver and be sure that the mechanism is back to its initial setting position (*1). Now place the cassette controller in position. (This method is applicable for the mechanism alone.)

COUPLING THE MECHANISM TO THE PWB

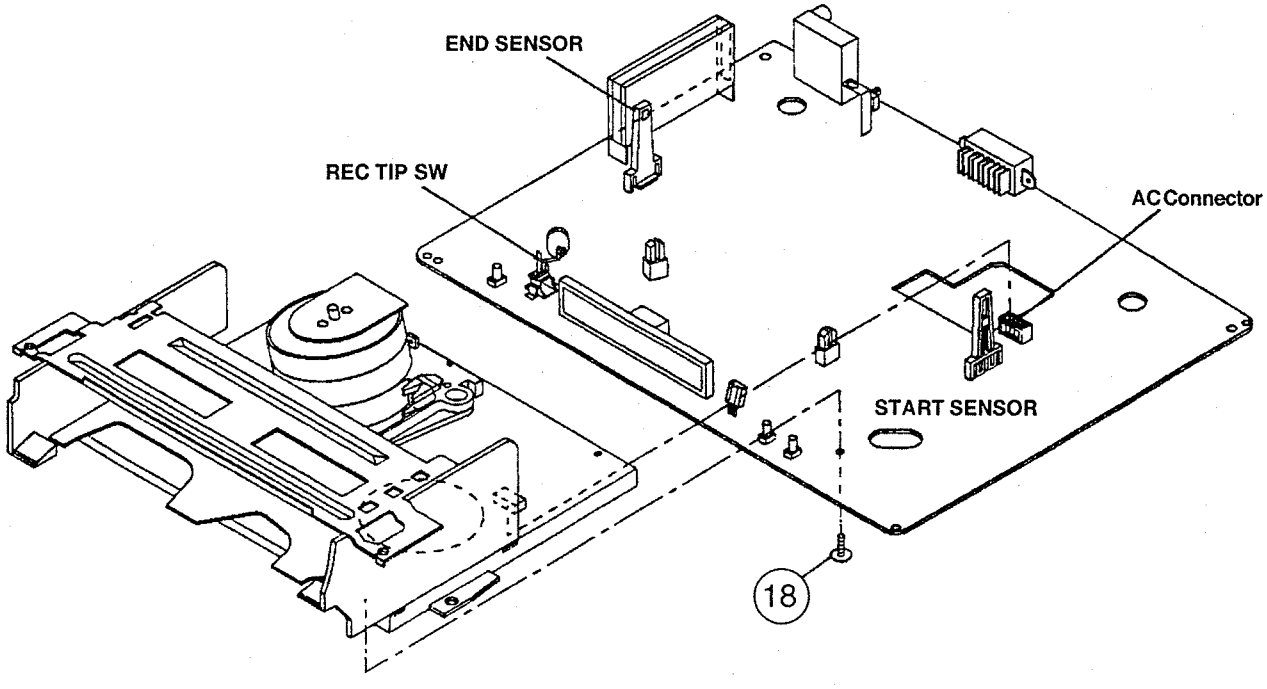
Match the mechanism's projections with the two symbols (round reference and oval sub-reference) on the main PWB. Place the mechanism straight down in position with due care so that the mechanism chassis's outer edges should not damage any parts nearby.

Tighten up the two screws (one for fixing the mechanism and the head amplifier shield, the other on the main PWB's soldering side and located near the loading motor) to fix the mechanism and main PWB. Reconnect the FFC cables (AA, AD and AH) and harnesses (AE and AL) between the mechanism and main PWB.

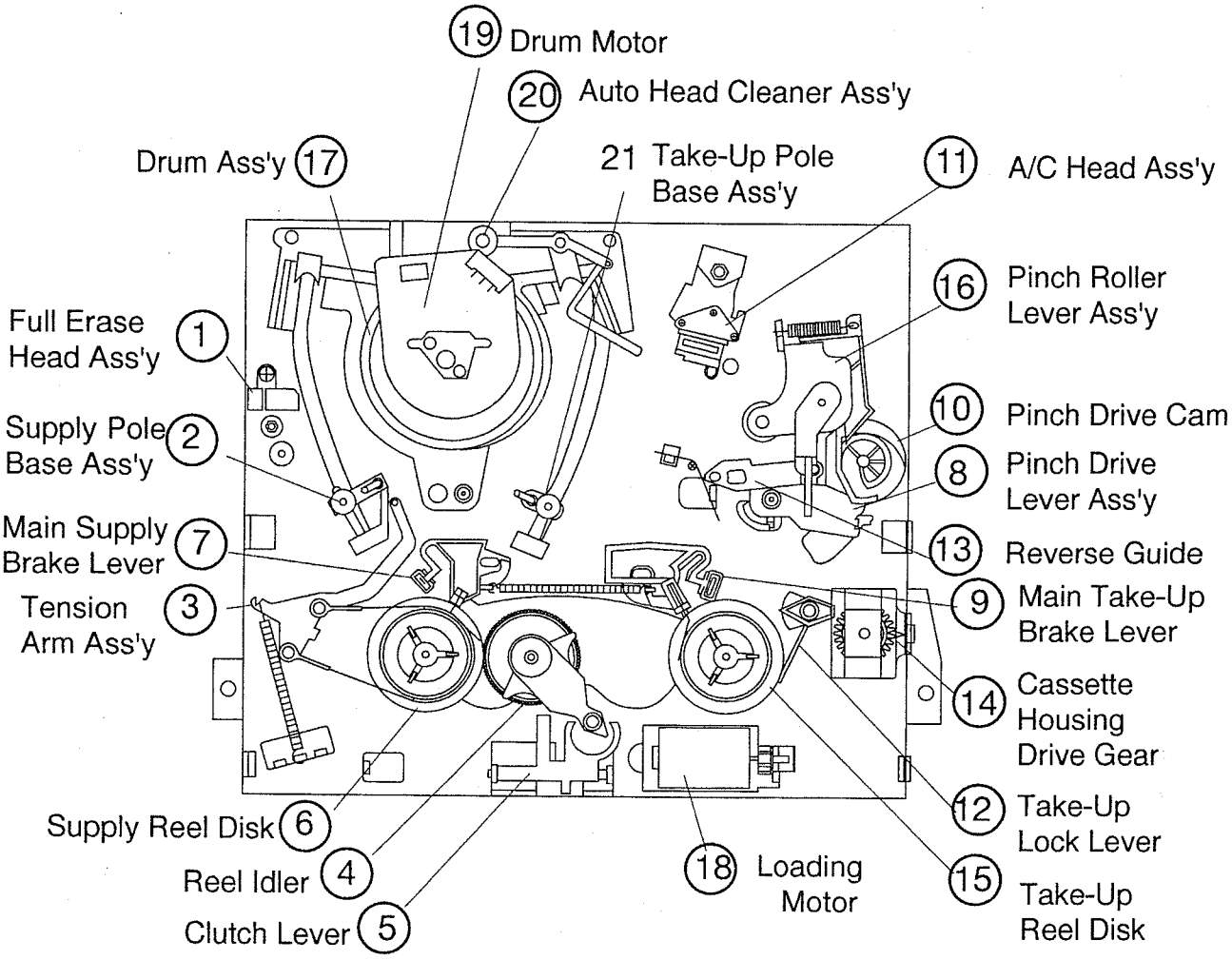
Parts to pay attention to:

Start and end sensors	Q851, Q852
Record tip switch	S851

Take special care of the MC-AC connector (board to board) between the mechanism and main PWB.

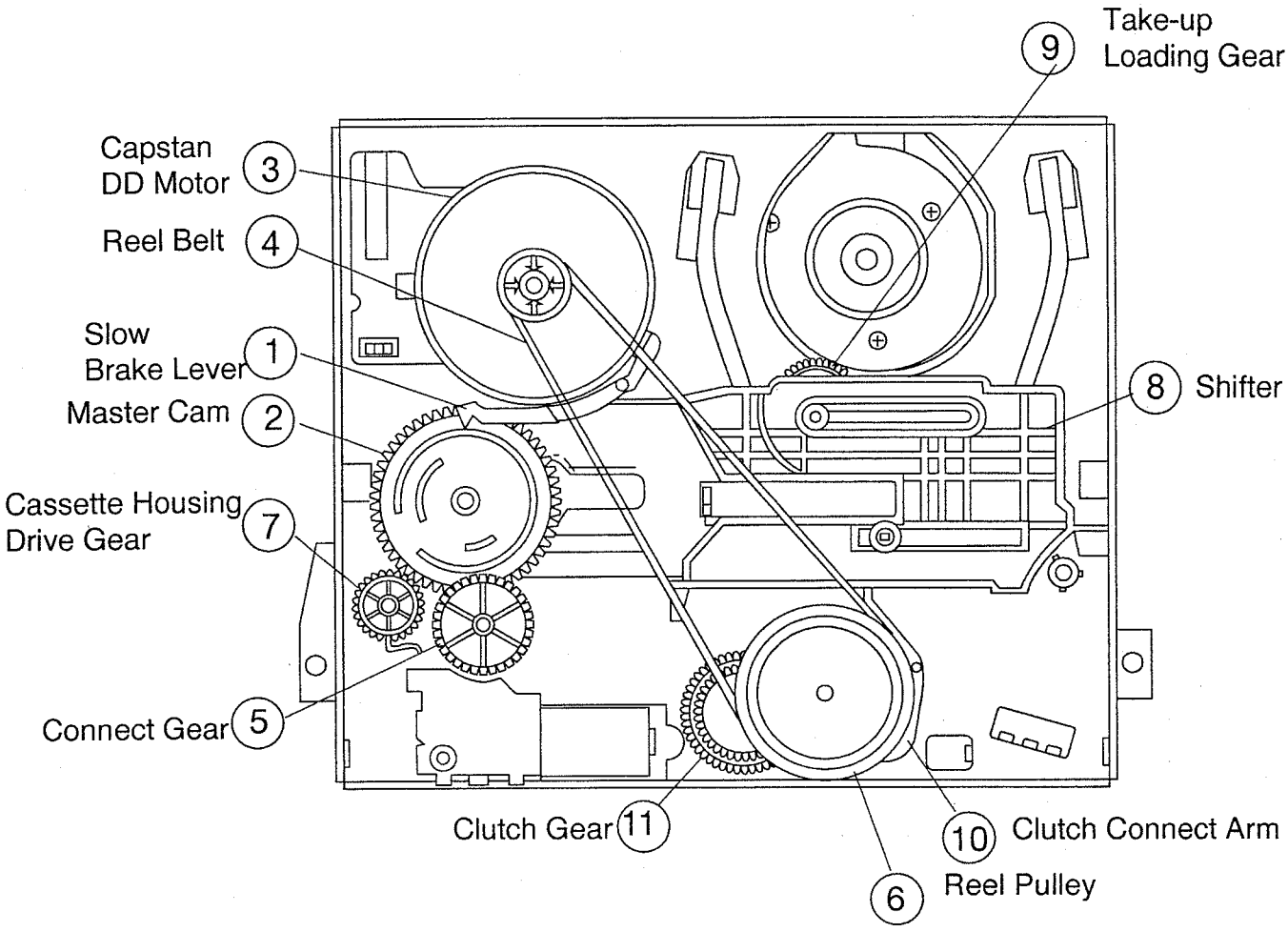


3. FUNCTION OF MAJOR MECHANICAL PARTS (TOP VIEW)


19 Drum Motor
20 Auto Head Cleaner Ass'y
Drum Ass'y 17
21 Take-Up Pole Base Ass'y
11 A/C Head Ass'y
16 Pinch Roller Lever Ass'y
Full Erase Head Ass'y 1
10 Pinch Drive Cam
Supply Pole Base Ass'y 2
8 Pinch Drive Lever Ass'y
Main Supply Brake Lever 7
13 Reverse Guide
Tension Arm Ass'y 3
9 Main Take-Up Brake Lever
14 Cassette Housing Drive Gear
Supply Reel Disk 6
12 Take-Up Lock Lever
Reel Idler 4
18 Loading Motor
15 Take-Up Reel Disk
Clutch Lever 5

No.	Function	No.	Function
1.	Full erase head ass'y Erase the whole records on the tape in the recording mode.	13.	Reverse guide Pulls out the tape and controls the tape drive train height with the upper and lower guides.
3.	Tension arm ass'y Detects the tension of tape while running, and brakes the supply reel disk via the tension band.	16.	Pinch roller lever ass'y Press-fits the tape to the capstan during tape running. The right protrusion switches the clutch of the cassette housing control assembly in "tape eject", and makes the mechanism eject tape.
7.	Main supply brake lever Brakes the supply reel disk to prevent tape slackening when the unit is stopped in fast forward or rewind mode.	18.	Loading motor A motive power which drives the mechanism. It transmits the power to the master cam and cassette housing control assembly.
9.	Main take-up brake lever Brakes the take-up reel disk to prevent tape slackening when the unit is stopped in fast forward or rewind mode.		

FUNCTION OF MAJOR MECHANICAL PARTS (BOTTOM VIEW)



No.	Function	No.	Function
1.	Slow brake lever Gets in contact with the capstan D.D. motor linking to the master cam in the slow still mode, and brakes it to a certain degree.	6.	Reel pulley Transmits the power of the capstan D.D. motor to the reel disk via the reel idler.
3.	Capstan D.D. motor A motive power which runs the tape. It transmits the power via the reel belt.	8.	Shifter Transmits the operation of the master cam to break and loading gear.
4.	Reel belt Transmits the power to run the tape to the reel pulley.	9.	Take-up loading gear Shifts the take-up pole base and guide roller via the loading relay gear, and applies the tape around the drum assembly, as well as transmits the power to the supply loading gear.

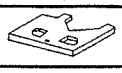
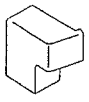
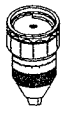
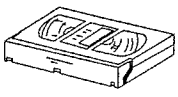
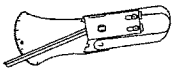
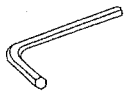
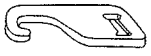
4. ADJUSTMENT, REPLACEMENT AND ASSEMBLY OF MECHANICAL UNITS

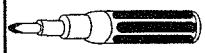
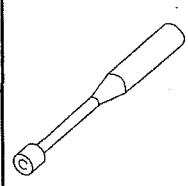
Here we will describe a relatively simple service work in the field, not referring to the more complicated repairs which would require the use of special equipment and tools (drum assembly replacement, for example).

We are sure that the easy-to-handle tools listed below would be more than handy for periodical maintenance to keep the machine in its original working condition.

TOOLS NECESSARY FOR ADJUSTING THE MECHANICAL UNITS

The following tools are required for proper service and satisfactory repair.

No.	Jig Item	Part No.	Configuration	Remarks
1	Reel Disk Height Adjusting Jig	JiGRH0002		These Jigs are used for checking and adjusting the reel disk height.
2	Master Plane Jig	JiGMP0001		
3	A/C Head Tilt Adjusting Jig	9DAACH-A323U		This Jig is used for setting the A/C head tilt.
4	Torque Gauge (90g)	JiGTG0090		These Jigs are used for checking and adjusting the torque of take-up and supply reel disks.
	Torque Gauge (1.2kg)	JiGTG1200		
5	Gauge Head	JiGTH0006		
6	Cassette Torque Meter	JiGVHT-063		This cassette torque meter is used for checking and adjusting the torque of take-up for measuring tape back tension.
7	Tension Gauge (300g)	JiGSG0300		There are two gauges used for the tension measurements, 300 g and 2.0kg.
	Tension Gauge (2.0kg)	JiGSG2000		
8	Hex Wrench (1.2mm)	JiGHW0012		These Jigs are used for loosening or tightening special hexagon type screws.
	Hex Wrench (1.5mm)	JiGHW0015		
9	Alignment Tape (PAL)	VROCPSV		These tapes are especially used for electrical fine adjustment.
11	Tension Gauge Adapter	JiGADP003		This Jig is used with the tension gauge. Rotary transformer clearance adjusting jig.

No.	Jig Item	Part No.	Configuration	Remarks
12	Special Bladed Screwdriver	JiGDRIVERH-4		This screwdriver is used for adjusting the guide roller height.
14	Torque Driver	JiGTD1200		This is used to screw down resinmade parts: the specified torque is 5kg.
15	Box Driver	JiGDRIVER110-7		This Jig is used for height adjustment of the A/C head and X-position.
		JiGDRIVER110-4		This Jig is used for replacement of the SI roller.
16	Reverse Guide Height Adjusting Jig	JiGRVGH-F18		This Jig is used for height adjustment of the reverse guide.

MECHANICAL PARTS REQUIRING PERIODICAL INSPECTION

Use the following table as a guide to maintain the mechanical parts in good operating condition.

Parts \ Maintained	500 hrs.	1000 hrs.	1500 hrs.	2000 hrs.	Possible symptom encountered	Remarks
Guide roller ass'y	□	□	□	○	Lateral noises Head occasionally blocked	Abnormal rotation or significant vibration requires replacement.
Supply impedance roller	□	□	□	○		
Supply impedance roller (inner hole and shaft)		□		□		Clean with pure high quality isopropyl alcohol.
Supply impedance roller flange	□	□	□	□		Clean tape contact part with the specified cleaning liquid.
Retaining guide	□	□	□	□		
Slant pole	□	□	□	○		
Video head (upper drum ass'y)	□	○□	□	○□	Poor S/N ratio, no colour	Clean tape contact area with the specified cleaning liquid.
Full-erase head	□	□	□	○	Poor colour, beating	
A/C head	□	□	□	○	Sound too small or distorted	
Lower drum ass'y					Poor flatness of the envelope with alignment tape	
Capstan D.D. Motor	□	□	□	○	No tape running, uneven colour	
Pinch roller	□	□	□	○	No tape running, tape slack	Clean rubber and rubber contact area with the specified cleaning liquid.
Reel belt		□		○	No tape running, tape slack, no fast forward/rewind motion	
Tension band ass'y				○	Cassette not loaded or unloaded	
Loading Motor				○		
Reel idler ass'y				○	No tape running	
Reel pully ass'y		□△		□○		
Clutch gear ass'y				○		
Main supply/take-up brake levers				○	Tape slack	
AHC (Automatic Head Cleaner)		○		○		Replace the roller of the cleaner when it wears down. Just change the AHC roller assembly for new one.

NOTE: ○ : Part replacement.
□ : Cleaning (For cleaning, use a lint-free cloth dampened with pure isopropyl alcohol).
△ : Oil refilling (The indicated point should be lubricated with high quality spindle oil every 1000hrs).

If the reading is out of the specified value, clean or replace the part.

REMOVAL AND REASSEMBLY OF CASSETTE HOUSING CONTROL ASSEMBLY

- **Removal**

1. Set the cassette ejected condition in the cassette eject mode.
2. Unplug the recorder from the main source.
3. Follow the procedures below in the specified order.
   a) Remove the cassette housing installation screws ① and ②.
   b) Slide and pull out the cassette housing control assembly upward.

- **Reassembly**

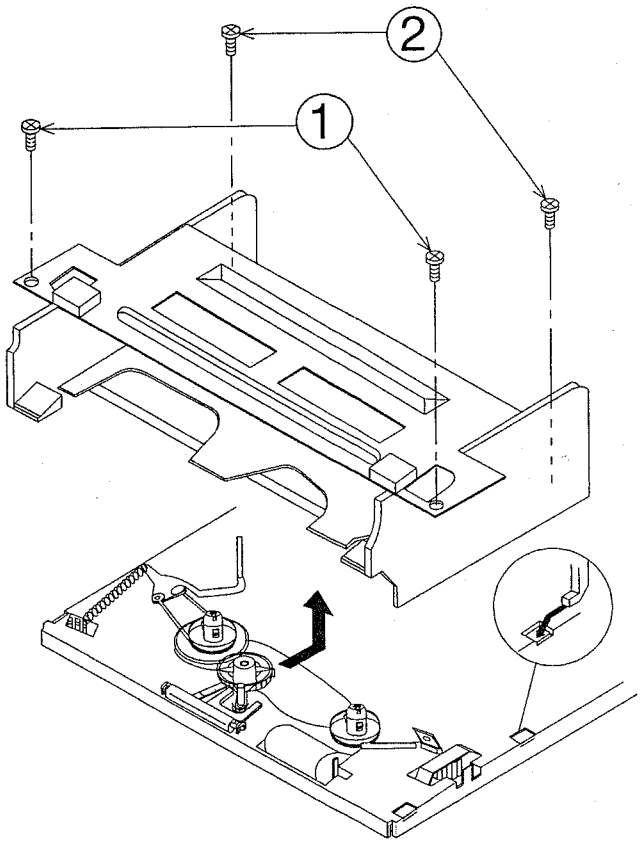


Figure 4-1.

1. Before installation of the cassette housing control assembly, make a connection between TP5001 and TP5002 , both located at the center on your side on the main PWB, with a 22 ohm resistor. Plug in the power cord. The cassette control drive gear starts and stops just when a tally mark appears in the mechanism chassis window. Align this tally mark with the cassette control drive angle's mark, as shown in Fig. 4-2, to position the cassette control on the mechanism chassis.

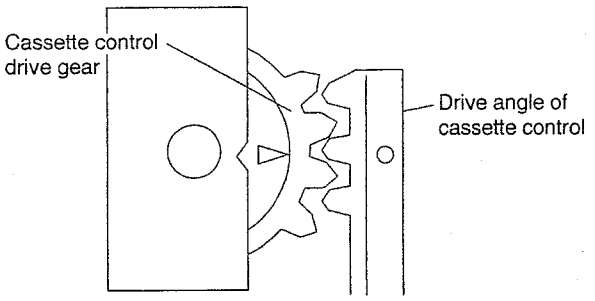


Figure 4-2.

2. Follow the procedures for removal in the reverse order.

Notes:

① In using a magnet screw driver, be sure to keep it away from the A/C head, FE (Full Erase) head, or the drum.

② In removal and reassembly, take care not to hit the cassette housing control assembly or tools against the guide pin, drum, or the like thereabout.

③ Load the cassette once onto the cassette housing control assembly after reassembly.

TO RUN A TAPE WITHOUT THE CASSETTE HOUSING CONTROL ASSEMBLY

1. Be sure to make a connection between TP5001 and TP5002 , both located at the center on your side on the main PWB, with a 22 ohm resistor, before turning on the power.
2. Plug in the power cord.
3. Turn on the power switch.
4. Open the lid of a cassette tape by hand.
5. Hold the lid with two pieces of vinyl tape.
6. Set the cassette tape in the mechanism chassis.
7. Stabilize the cassette tape with a weight (500g) to prevent floating.
8. Perform running test.

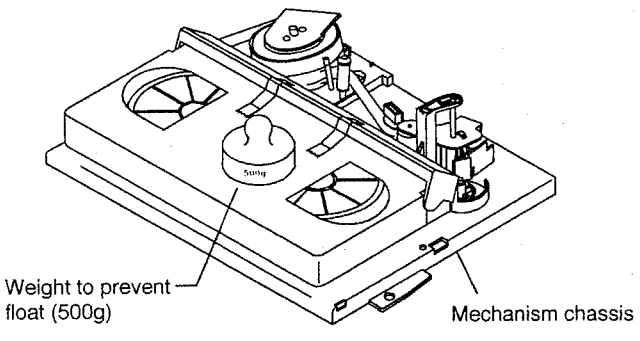


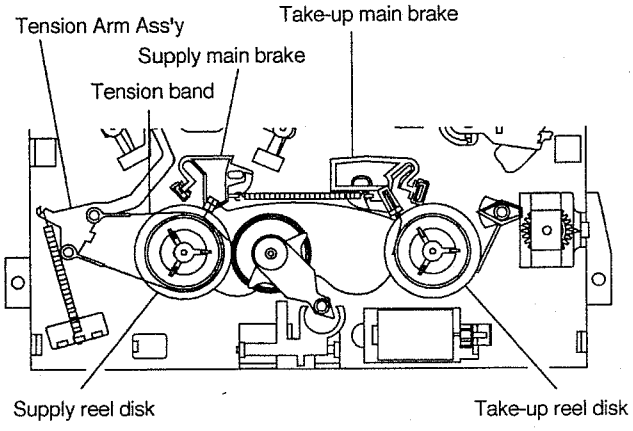
Figure 4-3.

Note:
The weight should not be more than 500g.

REPLACEMENT AND HEIGHT CHECKING AND ADJUSTMENT OF REEL DISKS

- **Removal (Supply and Take-up reel disks)**

1. Remove the cassette housing control assembly.
2. Pull the tension band out of the tension arm.
3. Remove the supply main brake and the take-up main brake.
4. Open the hook at the top of the reel disk, and remove the reel disk.



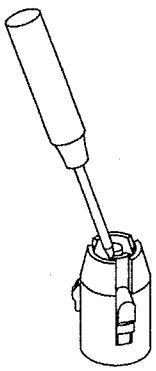


Figure 4-4.

Note:
When the tension band is pressed in the direction of the arrow for removal, the catch is hard to be deformed.

Figure 4-5.

- **Reassembly (Supply reel disk)**

1. Clean the reel disk shaft and apply oil to it.
2. Install a new supply reel disk onto the shaft.
3. Replace the tension band around the supply reel disk, and insert it to the hole of the tension arm.
4. Check the reel disk height and reassemble the supply main brake.

Notes:
① Take enough care not to deform the tension band during installation of the supply reel disk.
② Be careful not to damage the supply main brake.

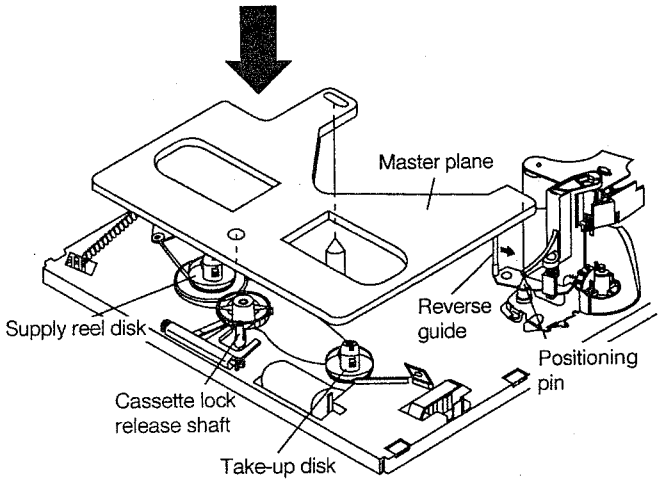
- **Reassembly (Take-up reel disk)**

1. Clean the reel disk shaft and apply oil to it.
2. Install a new take-up reel disk onto the shaft.
3. Check the reel disk height and reassemble the take-up main brake.

Note:
Take care not to damage the take-up main brake.
* After reassembly, check the video search rewind back tension (see page 20), and check the brake torque (see page 23).

- **Height checking and adjustment**

Note:
Place the master plane onto the mechanism unit, taking care not to hit the drum (see Figure 4-6).



Set the master plane releasing the reverse guide by a finger.

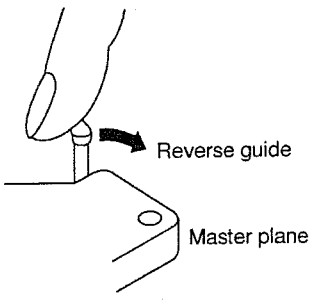


Figure 4-6.

- Check that the reel disk is lower than part A but higher than part B. If the height is not correct, readjust the reel disk height by changing the poly-slider washer under the reel disk.

Note:
Whenever replacing the reel disk, perform the height checking and adjustment.

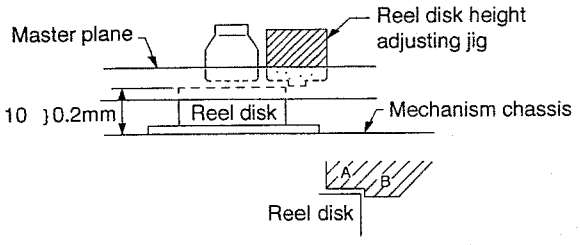


Figure 4-7.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN FAST FORWARD MODE

- **Remove the cassette housing control assembly.**

- **Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**

- **Setting**

1. Set a torque gauge to zero on the scale. Place it on the take-up reel disk.
2. Press the FF button to set the mechanism to the fast forward mode.

- **Checking**

1. Turn the torque gauge slowly (one rotation every 2 to 3 seconds) by hand in the take-up direction.
2. Check to see if the take-up torque is higher than 69 mN•m (700 gf•cm).

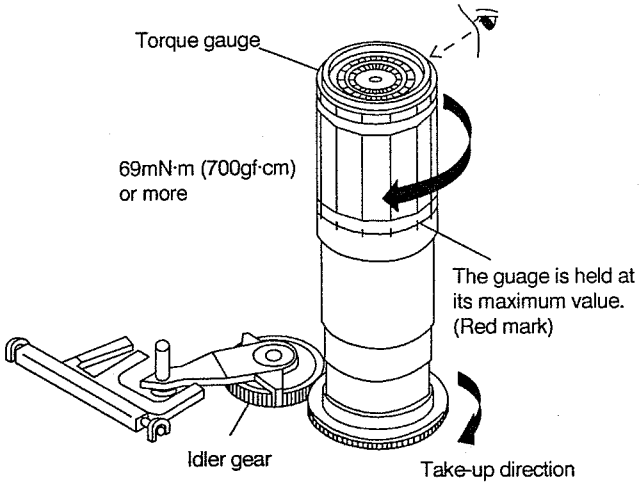


Figure 4-8.

- **Adjustment**

1. If the take-up torque is outside the range, clean the capstan D.D. motor pulley, reel belt and reel pulley with cleaning liquid, then recheck the torque.
2. If the take-up torque is still out of range, replace the reel belt.

Notes:
1. Hold down the torque gauge so that it does not fly off.
2. When checking the take-up torque, do not keep the reel disk locked for a longer time.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN REWIND MODE

- **Remove the cassette housing control assembly.**

- **Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**

- **Setting**

1. Set a torque gauge to zero on the scale. Place it on the supply reel disk.
2. Press the REW button to set the mechanism to the rewind mode.

- **Checking**

1. Turn the torque gauge slowly (one rotation every 2 to 3 seconds) by hand in the take-up direction.
2. Check to see if the take-up torque is higher than 69 mN•m (700 gf•cm).

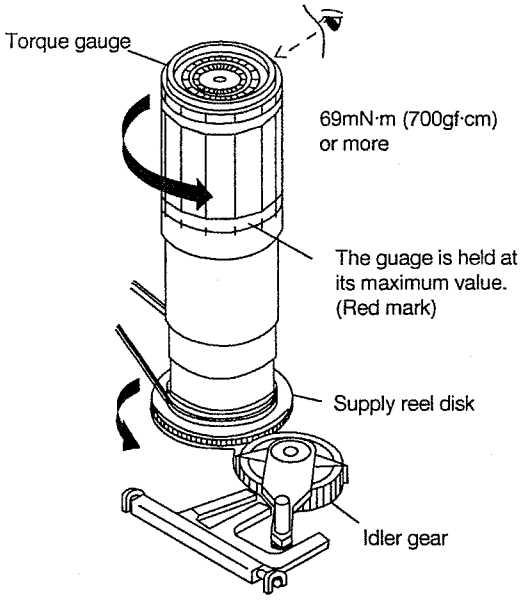


Figure 4-9.

• **Adjustment**

1. If the take-up torque is outside the range, clean the capstan D.D. motor pulley, reel belt and reel pulley with cleaning liquid, then recheck the torque.
2. If the take-up torque is still out of range, replace the reel belt.

Notes:

1. Hold down the torque gauge so that it may not fly off.
2. When checking the take-up torque, do not keep the reel disk locked for a long time.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN PLAYBACK MODE

1. Remove the cassette housing control assembly.
2. Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.
3. Open the lid of the cassette torque meter, and hold it with two pieces of vinyl tapes.
4. Load the cassette torque meter into the unit.
5. Put the weight (500g) on the cassette torque meter.
6. Press the REC button to put the unit in REC mode.

• **Checking**

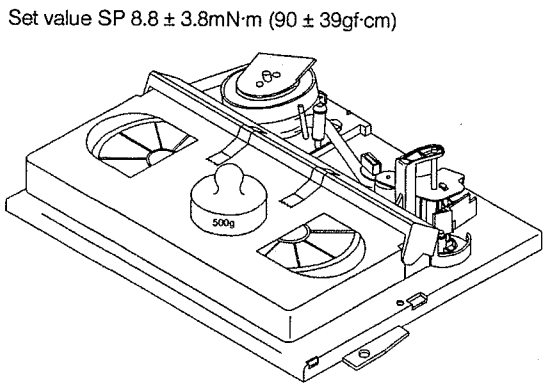


Figure 4-10.

1. Check that the torque is in the range of 8.8±3.8mN•m (90 ± 39gf•cm).
2. The torque fluctuates due to the rotational deviation of the reel pulley ass'y. Use the center of the fluctuation as the value.
3. Place the ass'y in the SP record mode, and check that the take-up torque is within the range.

• **Adjustment**

If the take-up torque in the playback mode is outside the range, replace the reel pulley ass'y.

Note:

Stabilize the cassette torque meter to prevent floating.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN VIDEO SEARCH REWIND MODE

• **Remove the cassette housing control assembly.**

• **Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**

• **Setting**

1. Push the PLAY button to place the ass'y in the playback mode.
2. Push the REW button to place the ass'y in the video search rewind mode.

• **Checking**

1. Place the torque gauge on the supply reel disk, and turn it counterclockwise very slowly (one rotation every 1 to 2 seconds) and check that the torque is within the set value 14.5^{+8}_{-6} mN•m (148^{+80}_{-60} gf•cm)

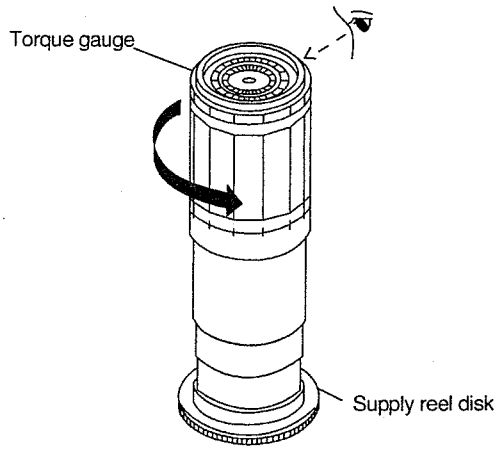


Figure 4-11.

Note:

Set the torque gauge securely on the supply reel disk. If it is not secure, the measurement will be incorrect.

• **Adjustment**

If the take-up torque in video search rewind mode is outside the range, replace the reel pulley ass'y.

Note:

The torque fluctuates due to the rotational deviation of the reel pulley ass'y. Use the center of the fluctuation at the value.

CHECKING THE FAST FORWARD BACK TENSION

Remove the cassette housing control assembly.

Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.

Checking

1. Push the FF button to place the ass'y in the fast forward mode.
2. Place the torque gauge on the supply reel disk, and turn it clockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is 1.5 ± 0.9mN•m (15 ± 9gf•cm).

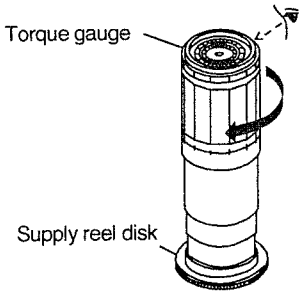


Figure 4-12.

Notes:

① Set the torque gauge securely on the supply reel disk. If the torque gauge is not securely set on the reel disk, measurement will be incorrect.
② Measure the torque with the torque gauge's weight exerted on the reel disk.

CHECKING THE REWIND BACK TENSION

- **Remove the cassette housing control assembly.**

- **Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**

- **Checking**

1. Push the REW button to place the ass'y in the rewind mode.
2. Place the torque gauge on the take-up reel disk, and turn it counterclockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is 1.3 ± 0.8 mN•m (13 ± 8gf•cm).

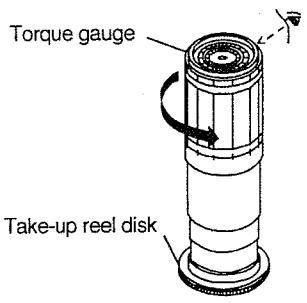


Figure 4-13.

Notes:

① Set the torque gauge securely on the take-up reel disk. If it is not secure, the measurement will be incorrect.
② Measure the torque with the torque gauge's weight exerted on the reel disk.

CHECKING THE VIDEO SEARCH REWIND BACK TENSION

- **Remove the cassette housing control assembly.**

- **Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**

- **Checking**

1. Push the PLAY button to place the ass'y in the playback mode.
2. Push the rewind button to place the ass'y in the video search rewind mode.
3. Place the torque gauge on the take-up reel disk, and turn it counterclockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is within the set value 4 ± 1.7mN•m (41 ± 17gf•cm).

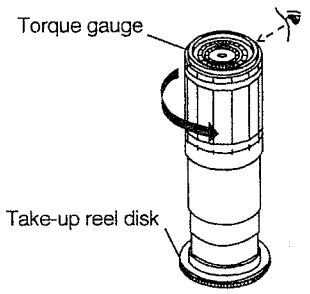


Figure 4-14.

Notes:

① Set the torque gauge securely on the take-up reel disk. If it is not secure, the measurement will be incorrect.
② Measure the torque with the torque gauge's weight not exerted on the reel disk.

CHECKING THE PINCH ROLLER PRESSURE

- **Remove the cassette housing control assembly.**

- **Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**

- **Checking**

Push the PLAY button to place the ass'y in the playback mode.

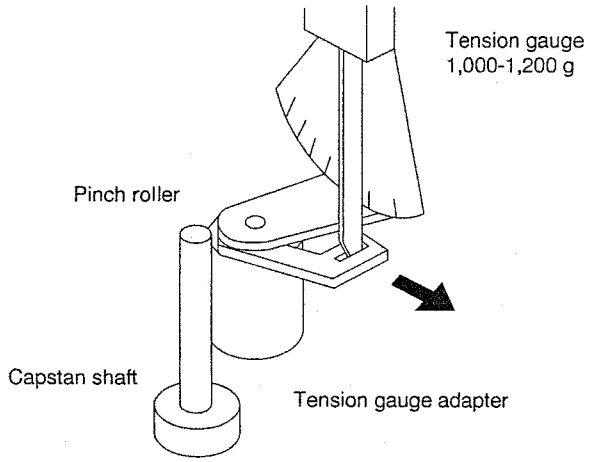


Figure 4-15.

1. Detach the pinch roller from the capstan shaft.
2. Set the tension gauge by hooking the tension gauge adapter onto the pinch roller shaft.
3. Gradually release the pressure to allow the pinch roller to touch the capstan shaft. When the pinch roller just touches the capstan shaft, read the indication on the gauge.
4. Check that the reading of the tension gauge is in the range of 900 to 1200 g.

CHECKING AND ADJUSTMENT OF TENSION POLE POSITION

- **Remove the cassette housing control assembly.**

- **Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**

- **Setting**

1. Open the lid of cassette tape (E-180), and hold it with two pieces of vinyl tapes.
2. Load the cassette tape into the unit.
3. Put the weight (500g) on the cassette tape.
4. Make the adjustment with the beginning of a E-180 tape.

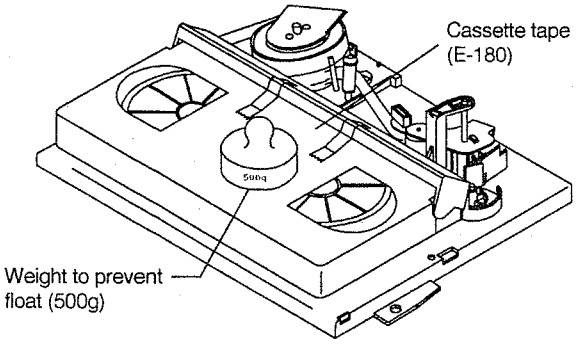


Figure 4-16.

- **Checking**

1. Set a cassette tape, press the REC button and get the tape loaded. Now check the tension pole position.
2. Visually check to see if the left end of the tension pole is in alignment with the line 0.2 mm left of the center line of the SI roller. Readjust as required in the following steps.

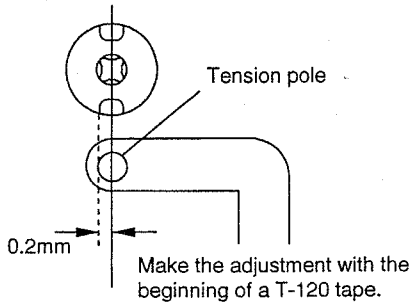


Figure 4-17.

① If the end is at the left from the dotted line:

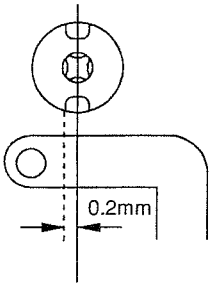


Figure 4-18.

1. Remove the cassette and press the REC button to make an empty loading. Put a bladed screwdriver into the tension band positioning cam and turn it clockwise.
2. Place the cassette in position and check the tension pole position.

② If the end is at the right from the dotted line:

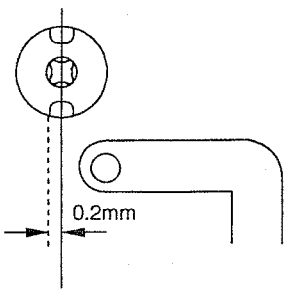


Figure 4-19.

1. Remove the cassette and press the REC button to make an empty loading. Put a bladed screwdriver into the tension band positioning cam to turn it counter-clockwise.
2. Place the cassette in position and check the tension pole position.

Notes:

① The tension band positioning cam cannot be adjusted with a cassette in place because the cam will be located below the cassette. Repeat a series of steps; empty loading, adjustment, cassette placement and position checking.

② Turn the positioning cam clockwise to move the tension pole to the right (in the black-arrow direction). Turn it counterclockwise to move the tension pole to the left (in the white-arrow direction).

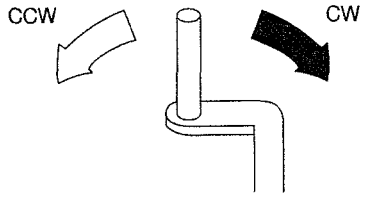


Figure 4-20.

③ Adjustable range of the tension pole positioning cam.

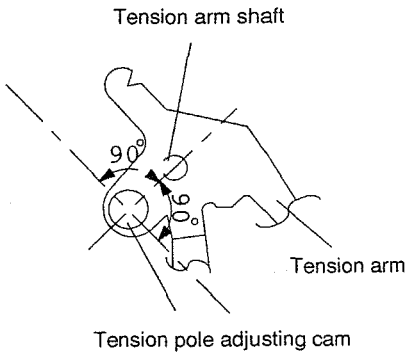


Figure 4-21.

Adjust the tension pole positioning cam so that the arrow mark on the cam be within 90° left and right from the tension arm shaft's center.

CHECKING AND ADJUSTMENT OF RECORD/PLAYBACK BACK TENSION

- **Remove the cassette housing control assembly.**

- **Make a connection between TP5001 and TP5002 both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**

- **Setting**

1. Open the lid of the cassette torque meter, and hold it with two pieces of vinyl tapes.
2. Load the cassette torque meter into the unit.
3. Put the weight (500g) on the cassette torque meter.

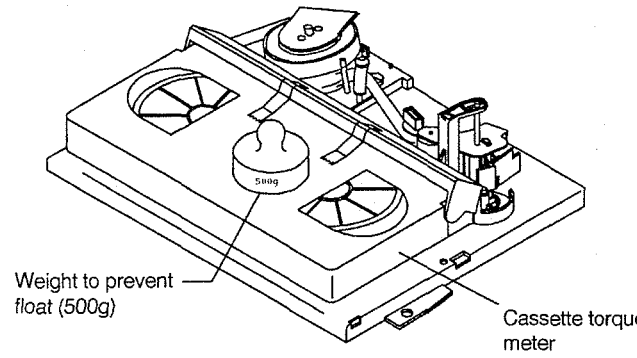


Figure 4-22.

- **Checking**

1. Push the REC button to place the unit in the record mode.
2. Check that the back tension indicated by the gauge is within the set range 31 to 38 g•cm.

Notes:

1. Make sure that the video cassette tape is over the retaining guide.
2. Make sure that the tape is not slack nor damaged at either end.

- **Adjustment**

1. If the reading of the cassette torque meter is less than specified, move the tension spring hook toward A.
2. If the reading of the cassette torque meter is more than specified, move the tension spring hook toward B.

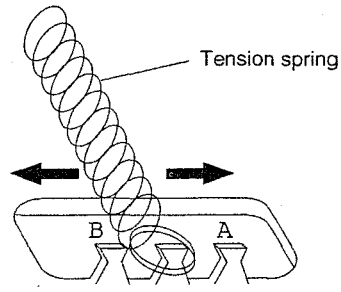
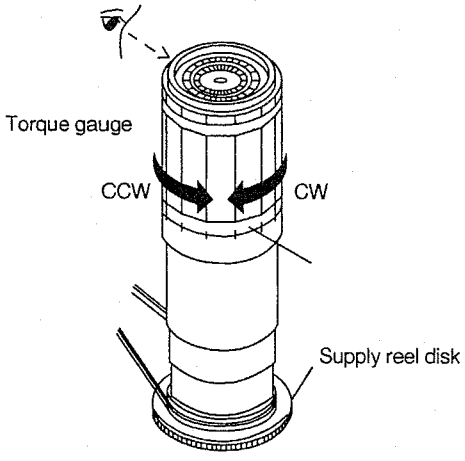


Figure 4-23.

CHECKING THE BRAKE TORQUE

- **Checking the brake torque at the supply side**



CCW:	5~15mN·m (50~150gf·cm)
CW:	10~32mN·m (102~326gf·cm)

Figure 4-24.

- **Remove the cassette housing control assembly.**

- **Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**

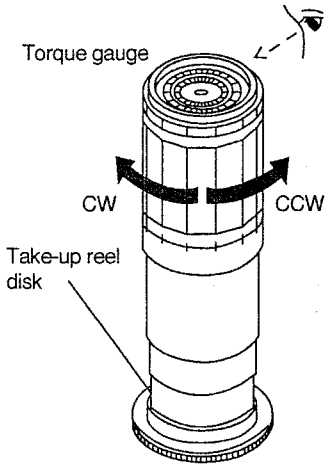
- **Setting**

1. Set a torque gauge to zero on the scale. Place it on the supply reel disk.
2. Switch from the FF mode to the STOP mode.
3. Disconnect the AC power plug.

- **Checking**

1. Slowly rotate the torque gauge in the clockwise (CW) direction and counterclockwise (CCW) direction of the supply brake so that the reel disk and the indicator of the torque gauge rotate at an equal rate. Check that the values are within the range of CW direction = 10~32mN•m (102~326gf•cm), CCW direction =5~15mN•m (50~150gf•cm), and that the brake torque in the CW direction is at least twice as high as that in the CCW direction.

- **Checking the brake torque at the take-up side**



CCW:	10~32mN·m (102~326gf·cm)
CW:	5~15mN·m (50~150gf·cm)

Figure 4-25.

- **Remove the cassette housing control assembly.**

- **Make a connection between TP5001 and TP5002 both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**

- **Setting**

1. Set a torque gauge to zero on the scale. Place it on the take-up reel disk.
2. Switch from the FF mode to the STOP mode.
3. Disconnect the AC power plug.

- **Checking**

1. Slowly rotate the torque gauge in the clockwise (CW) direction and counterclockwise (CCW) direction of the take-up brake so that the reel disk and the indicator of the torque gauge rotate at an equal rate. Check that the values are within the range of CCW direction= 10~32mN•m (102~326gf•cm), CW direction = 5~15mN•m (50~150gf•cm), and that the brake torque in the CCW direction is at least twice as high as that in the CW direction.

- **Adjustment of the brake torque at the supply side and the take-up side**

1. If the supply or take-up brake torque is outside the range, clean the supply or take-up reel disk break lever pad, then recheck the torque.
2. If the supply or take-up brake torque is still outside the range, replace the main brake ass'y or the main brake spring.

Note:
When the main brake is replaced, perform the height checking and adjustment of reel disks (see page 17), and the brake torque checking.

REPLACEMENT OF A/C (Audio/Control) HEAD

1. Remove the cassette housing control assembly.
2. Place the unit in the unloading mode, and unplug the power cord.

- **Removal**

1. Loosen the tilt adjusting screw 1.
2. Remove the azimuth adjusting screw 2.
3. Remove the A/C head screw 3.
4. Unsolder the A/C head PWB soldered to the A/C head assembly.

Notes:

1. After replacement, be sure to perform the adjustment of the tape drive train (see page 26). Under any circumstances, avoid touching the head. Clean the head, if touched with your finger, with alcohol.
2. Take care that the azimuth spring does not fly off when removing the A/C head screw.

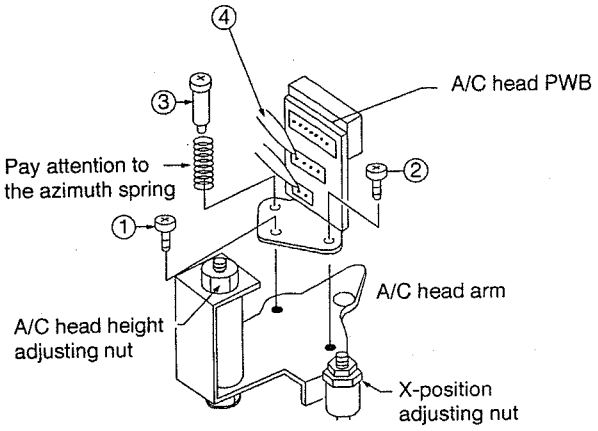


Figure 4-26.

- **Replacement**

1. Solder the removed A/C head PWB onto a new A/C head assembly.
2. The A/C head assembly is attached so that the A/C head arm and A/C head plate are roughly parallel to each other.

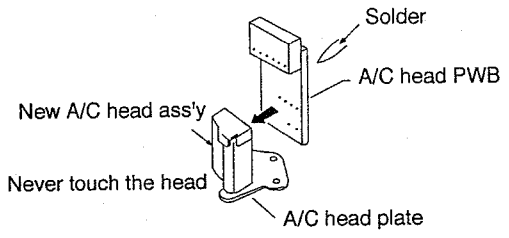


Figure 4-27.

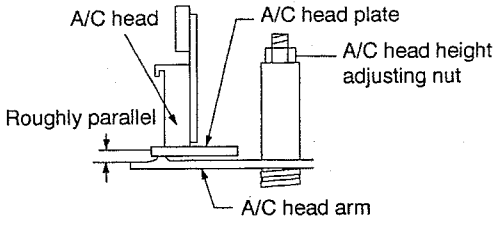
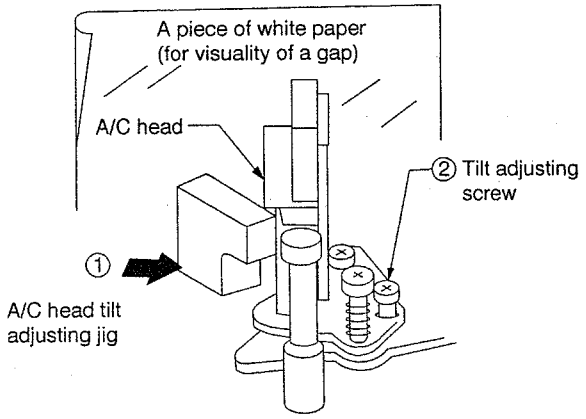


Figure 4-28.

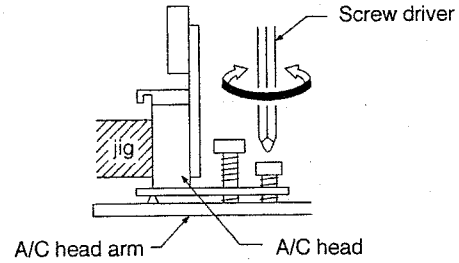
- **Adjustment**

[A/C head tilt angle]

1. Set the mechanism to the loading mode.
2. Place the A/C head tilt adjusting Jig①.
3. Slowly turn the tilt adjusting screw ② with a screw driver until there is no gap between the Jig and the A/C head.



(a)

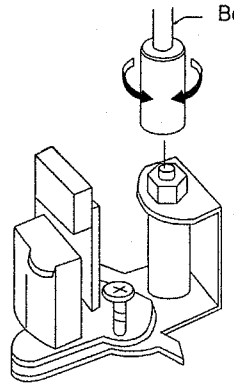


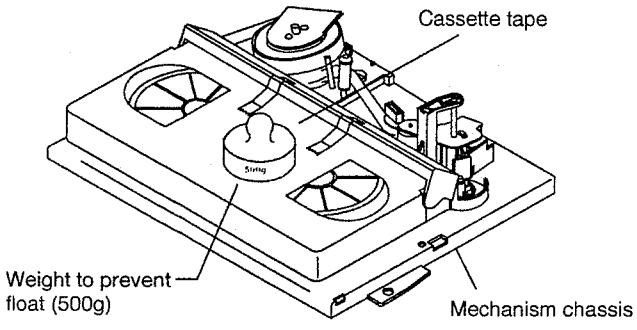
(b)

Figure 4-29.

[A/C head height rough adjustment]

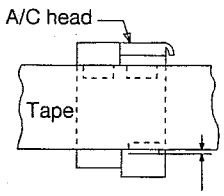
- **Setting**





① Roughly adjust the height of the A/C head by turning the A/C head adjusting hexagon nut with the specialized box driver until the tape is in the position shown below.
② Set the cassette tape to the mechanism chassis.
③ Press the PLAY button to the put the unit in the playback mode.

- **Adjustment**



Adjust the nut visually so that the control head is visible 0.3 to 0.5mm below the bottom of the tape.

Figure 4-30.

HEIGHT ADJUSTMENT OF REVERSE GUIDE

[Height adjustment of reverse guide]

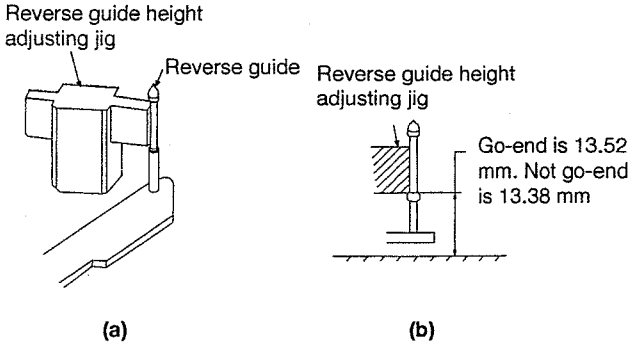


Figure 4-31.

1. In the tape load mode, make adjustment at the 13.38mm side first and then rotate the height adjusting nut by 1/6 turn counterclockwise.
2. Actually load the unit with a tape, put it in the play mode, and make sure the tape is free from wrinkles near the reverse guide.
3. Use a commercially available box driver to turn the height adjusting nut.

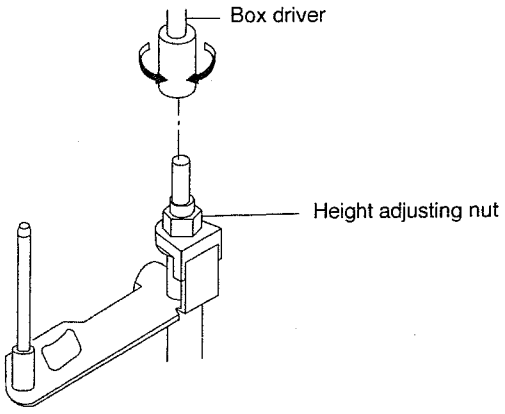


Figure 4-32.

ADJUSTMENT OF TAPE DRIVE TRAIN

1. Remove the cassette housing control assembly.
2. Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.
3. Check and adjust the position of the tension pole. (See page 21.)
4. Check and adjust the video search rewind back tension. (See page 20.)
5. Set the tilt angle of the A/C head. (See page 24.)
6. Rough adjustment of tape drive train.
   a) Connect the oscilloscope to the test point for PB CHROMA envelope output (TP301). Set the synchronism of the oscilloscope to EXT. The PB CHROMA signal is to be triggered by the head switching pulse (TP302).
   b) Loosen the setscrew at the lower part of the guide roller, and adjust it with an adjusting screw driver (JIGDRIVERH-4) so that the guide roller turns smoothly. (Do not overloosen the setscrew, which causes insecurity of the guide roller.) (See Figure 4-33.)
   c) Set the alignment tape (monoscope pattern) on the reel disk, and place the unit in the playback mode.
   (Place a 500 g weight on the cassette tape to prevent floating of the cassette tape.)

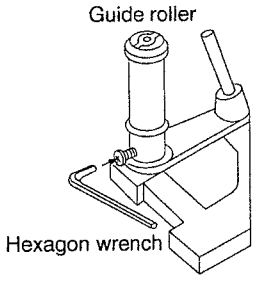


Figure 4-33.

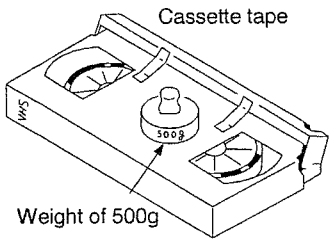
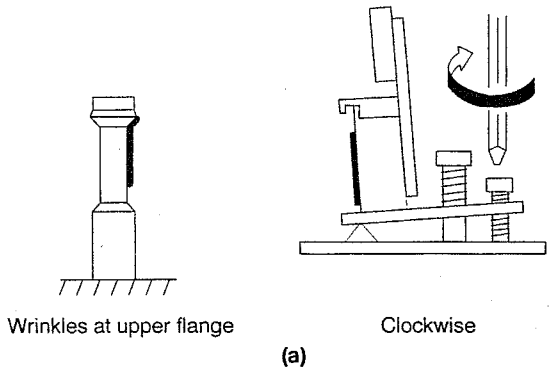


Figure 4-34.

   d) In the X value adjustment mode (see the Electrical Adjustment), change the envelope waveform from MAX to MIN, and MIN to MAX by pushing the (+) or (-) tracking button, and check a flat response is obtained on the waveform.
   e) If a flat response cannot be obtained, roughly adjust the guide rollers on the supply side and take-up side using an adjusting screw driver until a flat response can be obtained.
   f) Turn the A/C head tilt adjusting screw with a screwdriver to prevent the tape from wrinkling at the upper and lower flanges of the fixed guide.
      1) Wrinkles at the upper flange : Turn the above adjusting screw clockwise, as shown in Figure 4-35 (a).
      2) Wrinkles at the lower flange : Turn the above adjusting screw counterclockwise, as shown in Figure 4-35 (b).



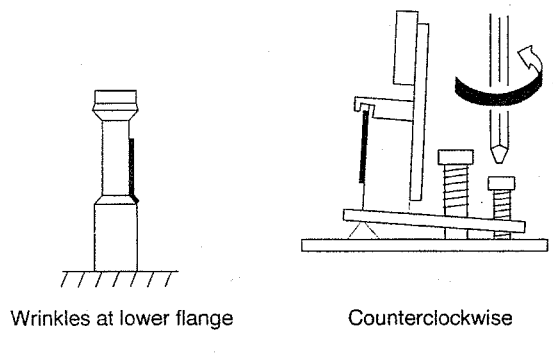


Figure 4-35.

Notes:

1. Place the tracking control in the center position, and adjust the X-position adjusting nut so that the PB CHROMA envelope becomes maximum for easier rough adjustment of the tape drive train.
2. In the rough adjustment, pay particular attention to the outlet side.

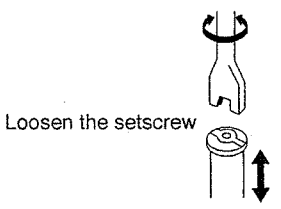


Figure 4-36.

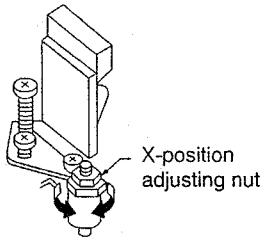


Figure 4-37.

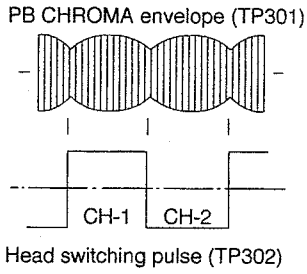


Figure 4-38.

7. Adjustment of A/C head height and azimuth
   a) Connect an oscilloscope to the audio output terminal.
   b) Use the alignment tape and play back its audio 7 kHz signal (monoscope pattern for video signal). Adjust the azimuth adjusting screw to obtain the maximum audio output on an oscilloscope. (See Figure 4-39.)
   c) Use the alignment tape and play back its audio 1 kHz signal (colour bar for video signal) and slowly rotate the A/C head height adjusting nut with the special box driver to obtain the maximum audio output.
   d) Perform the adjustment in b) again.
   e) After this adjustment, apply glyptal to the screws and nuts to fix them.

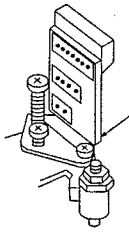


Figure 4-39.

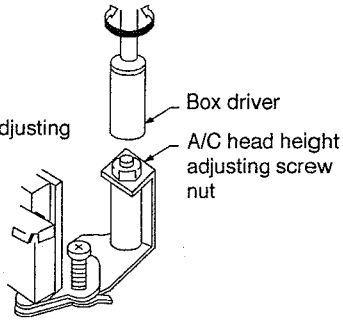


Figure 4-40.

8. Adjustment of tape drive train and X-Position.
   a) Connect the oscilloscope to the test points (TP201) for PB CHROMA envelope output. Set the synchronism of the oscilloscope to EXT. The PB CHROMA signal is to be triggered by the head switching pulse (TP202).
   b) Play back the tape drive train alignment tape.
   c) Push the (+) or (-) button to change the envelope waveform from MAX to MIN, and MIN to MAX. Adjust the guide roller's height on the supply and take-up sides with an adjusting screw driver, to obtain an envelope waveform that is as flat as possible.
   d) If the tape is above or below the helical lead, the PB CHROMA waveform will take the shape shown in Figure 4-41.
   e) Adjust for maximum flatness of the envelope as the step 6, e) in page 26.

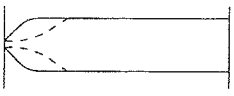
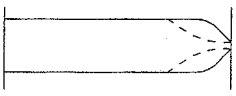
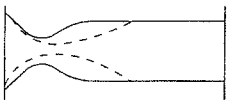
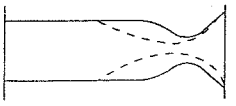
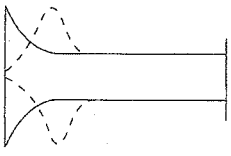
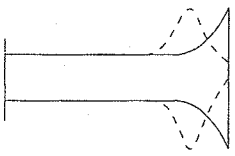
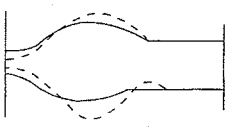
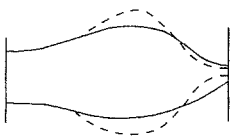
	When the tape is above the helical lead.		When the tape is below the helical lead.	
	Supply side	Take-up side	Supply side	Take-up side
				
				
Adjustment	Supply side guide roller rotated in clockwise direction (lowers guide roller) to flatten envelope.	Take-up side guide roller rotated in clockwise direction (lowers guide roller) to flatten envelope.	Supply side guide roller rotated in counterclockwise direction (raises guide roller) to make the tape float above the helical lead. The supply side guide roller is then rotated in the clockwise direction to flatten the envelope.	Take-up side guide roller rotated in counterclockwise direction (raises guide roller) to make the tape float above the helical lead. The take-up side guide roller is then rotated in the clockwise direction to flatten the envelope.

Figure 4-41.

f) Push the (+) or (-) tracking button to check that a flat response is obtained on the envelope waveform.
g) Secure the guide roller by tightening the guide roller setscrew in the unloading mode.
h) Play back the tape drive train alignment tape to check that the envelope waveform does not change.

9. Adjustment of A/C head X-position.
   a) In the X value adjustment mode (see the Electrical Adjustment), make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor to center the tracking.
   b) Rotate the X-position adjusting nut with an adjusting box driver, and adjust the A/C head position for maximum head switching pulse low side envelope.
   c) Adjust the playback switching point.
   d) Check the flatness of the envelope waveform and sound by playing back a recorded tape.

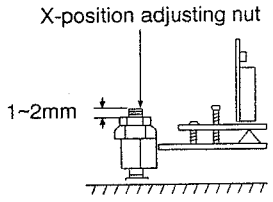


Figure 4-42.

REPLACEMENT OF THE CAPSTAN D.D. (DIRECT DRIVE) MOTOR

- **Remove the cassette housing control assembly.**

- **Removal (Follow the order of indicated numbers.)**

1. Disconnect from the board-to-board connector on the main PWB.
2. Remove the reel belt①
3. Remove the screws②

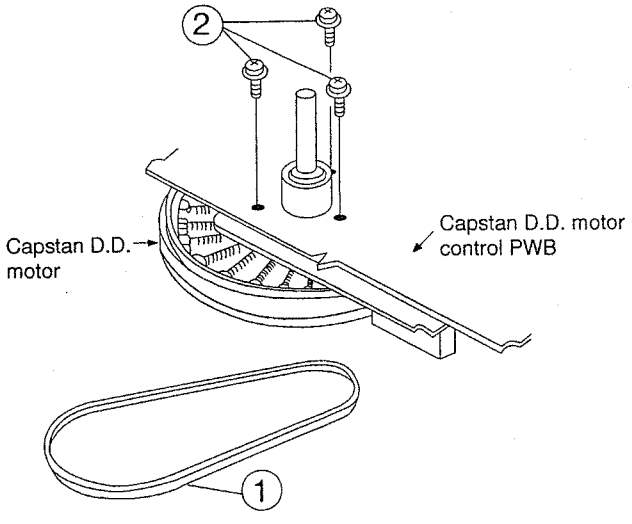


Figure 4-43.

- **Reassembly**

1. Mount the capstan motor on the mechanism chassis making sure not to allow the capstan shaft to hit the mechanism chassis, and attach it with the three screws.
2. Attach the reel belt. Reconnect to the board-to board connector on the main PWB.

Notes:

1. After installing the capstan D.D. motor, be sure to rotate the capstan D.D. motor and check the movement.
2. Check the servo circuit.

REPLACEMENT OF DRUM D.D MOTOR

1. Put the unit in the cassette eject position.
2. Unplug the power cord.

- **Removal (Reverse the order in reassembly.)**

1. Disconnect the FFC cable①.
2. Unscrew the stator assembly fixing screws②.
3. Take out the stator assembly③.
4. Unscrew the rotor assembly fixing screws④.
5. Take out the rotor assembly⑤.

Notes:

1. In removing the stator assembly, part of the drum earth spring pops out of the pre-load collar. Be careful not to lose it.
2. Secure the rotor assembly so that the installation positioning holes in the rotor assembly and upper drum assembly match. (Match the upper drum's notch with the rotor's hole.)
3. Be careful not to damage the upper drum or the video head.
4. Be sure that the hall device and the stator assembly are not damaged by the rotor assembly or other parts.
5. After installation, adjust the playback switching point.

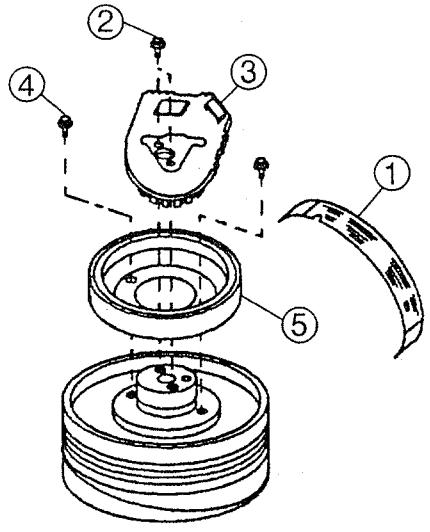


Figure 4-44

REPLACEMENT OF UPPER DRUM

(2-head/4-head drum models are applicable here. Hi-fi models are equipped with an upper-and-lower drum assembly.)

Note:

The gap between the lower drum and the upper drum is very accurate, in the order of microns, and care should be paid to their replacement. Even a slight amount of foreign material will affect the accuracy of their reassembly.

Replacement (Follow the order of the indicated numbers.)

1 Remove the drum earth brush and its spring 1
2 Put a mark for the direction of the pre-load collar and the drum shaft 2
3 Loosen the set screws (M4) 3 of the pre-loaded collar. Take out the pre-load collar upward.
4 Pull up the upper drum 4 out of position.

Note:

1. Remove the drum motor, referring to the drum motor replacement.
2. Put a mark, with a marking pen or the like, in order to identify the direction of the pre-load collar and the drum shaft. Now remove the pre-load collar.
3. Be careful not to lose the drum earth brush and drum earth brush spring.
   Handle the brush with care not to allow any dust and foriegn matters on it.
4. Avoid touching the drum surface with bare hands.
5. Pull out the upper drum with care so that it may not be tilted.
6. Do not hit the screws when tightening them.

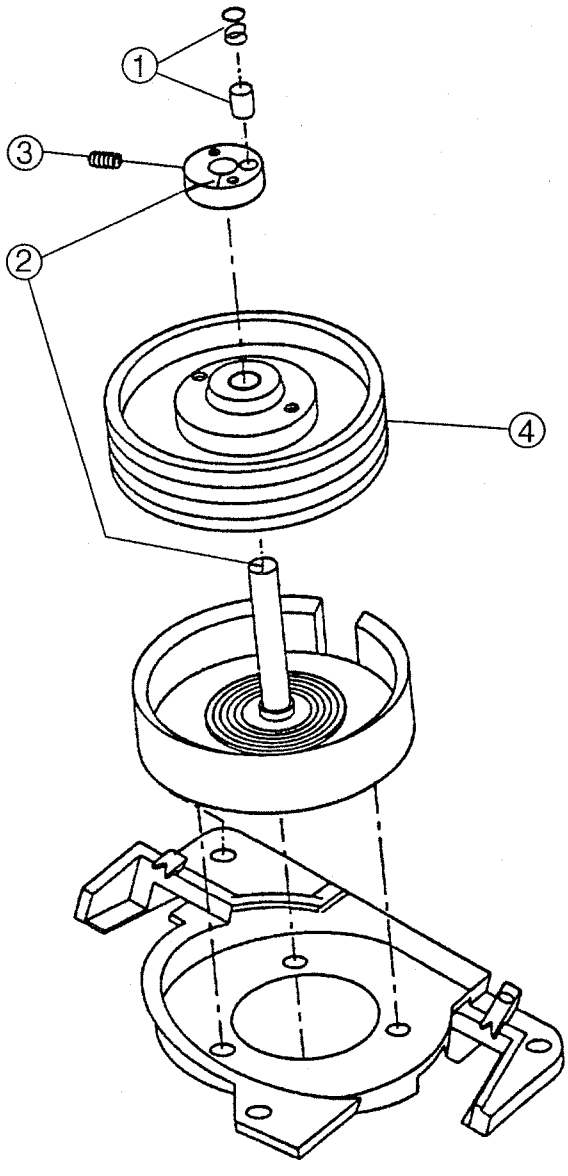


Figure 4-44(a)

Drum replacement (for 2/4 drums; drum assembly supplied for Hi-Fi models)

1. Clean up the drum shaft.
2. Make a clearance at the rotary transformer. This is an important procedure to maintain the perform ance.
   1) Some rotary transformer clearance shims are packaged in the servicing upper drum assembly or lower drum assembly. Install the thinnest (0.06mm) of the shims onto the lower drum shaft. (Refer to Fig. 4-44(b) for thickness.)
   2) Install the upper drum assembly onto the drum shaft.
   3) Install the pre-load collar.
   4) Exert a force of 14.7N (1.5 kgf) on the pre-load collar from above (using a commercially available load meter). Tighten up the set screws (M4) of the pre-load collar.
   5) Turn the upper drum by hand and listen to see if the rotary transformer gives no rubbing sound.
   6) If the transformer sounds, replace the installed shim with the next thicker shim.
   Take the above steps 1) thru 5) until no rubbing sound is heard any longer.
   7) Make sure no rubbing sound is heard. Finally add the 0.03mm thick shim.
3. Place the pre-load collar back in position in the direction marked in disassembling. (See Fig. 4-44(a) for setting.)
4. Exert a force of 14.7N (1.5kgf) upon the pre-load collar from above. Tighten up the set screws of the pre-load collar (1.18Nm (12 kgf-cm)).
5. Place the drum earth brush, drum earth brush spring and drum motor back in position.
6. After replacement, be sure to check the tape drive train adjustment (See page 22) and the following electric adjustments.
   Adjustment of the playback switching point.
   Checking and adjustment of the X-position.
   Adjustment of SP and LP slow tracking preset.

Precautions in drum replacement

1. The drum assembly is very delicate. Handle it with enough care.
2. Be certain that the drum surface is free from dust, dirt and other foriegn matters.
3. Carefully adjust the rotary transformer clearance because this adjustment is important in order to maintain the performance.
4. Install the upper drum straight down to the drum shaft. Do not apply any excessive force upon the upper drum.

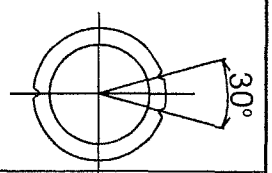
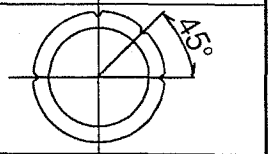
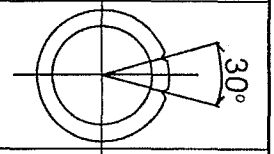
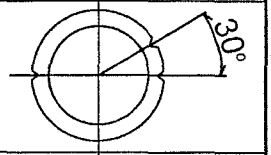
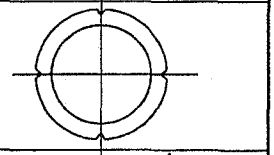
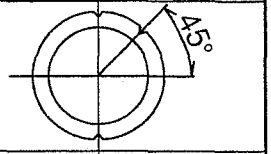
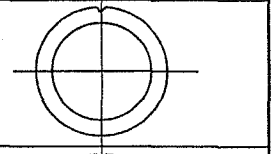
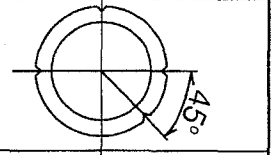
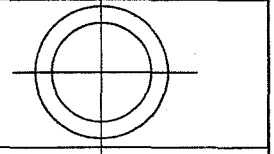
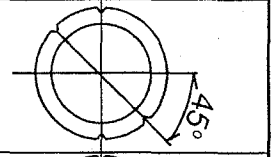
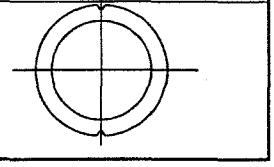
No.	Thickness (mm)	Shape
1	t=0.080	
2	t=0.090	
3	t=0.100	
4	t=0.110	
5	t=0.120	
6	t=0.130	
7	t=0.140	
8	t=0.150	
9	t=0.160	
10	t=0.170	
11	t=0.180	

Figure 4-44(b)

ASSEMBLE THE MECHANISM'S PARTS REQUIRING THE PHASE MATCHING IN THE STEPS BELOW.

1. Assembling the pinch roller assembly and the pinch drive cam (on the front of the mechanism chassis).
2. Mounting the shifter (on the back of the mechanism chassis).
3. Mounting the master cam (on the back of the mechanism chassis).
4. Mounting the connection gear, slow brake and loading motor assemblies (on the back of the mechanism chassis).

1. Assembling the pinch roller assembly and the pinch drive cam (on the front of the mechanism chassis).

Place the following parts in position in numerical order.

(1) Pinch drive cam①
(2) Pinch roller and pinch double-action lever②
(3) Open lever③

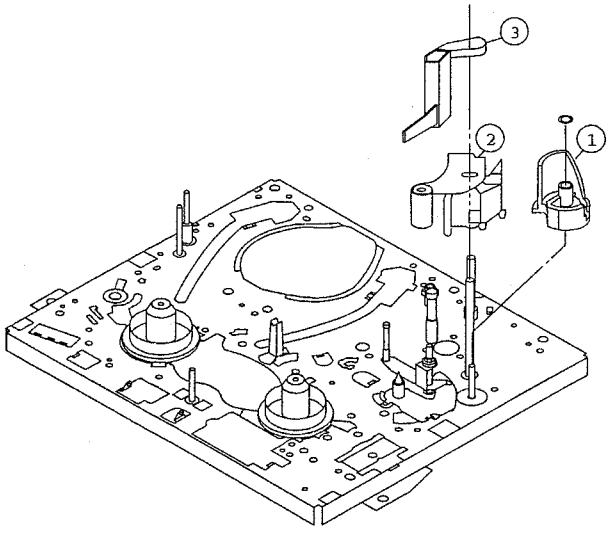


Figure 4-45.

① Insert Pinch Drive Cam.

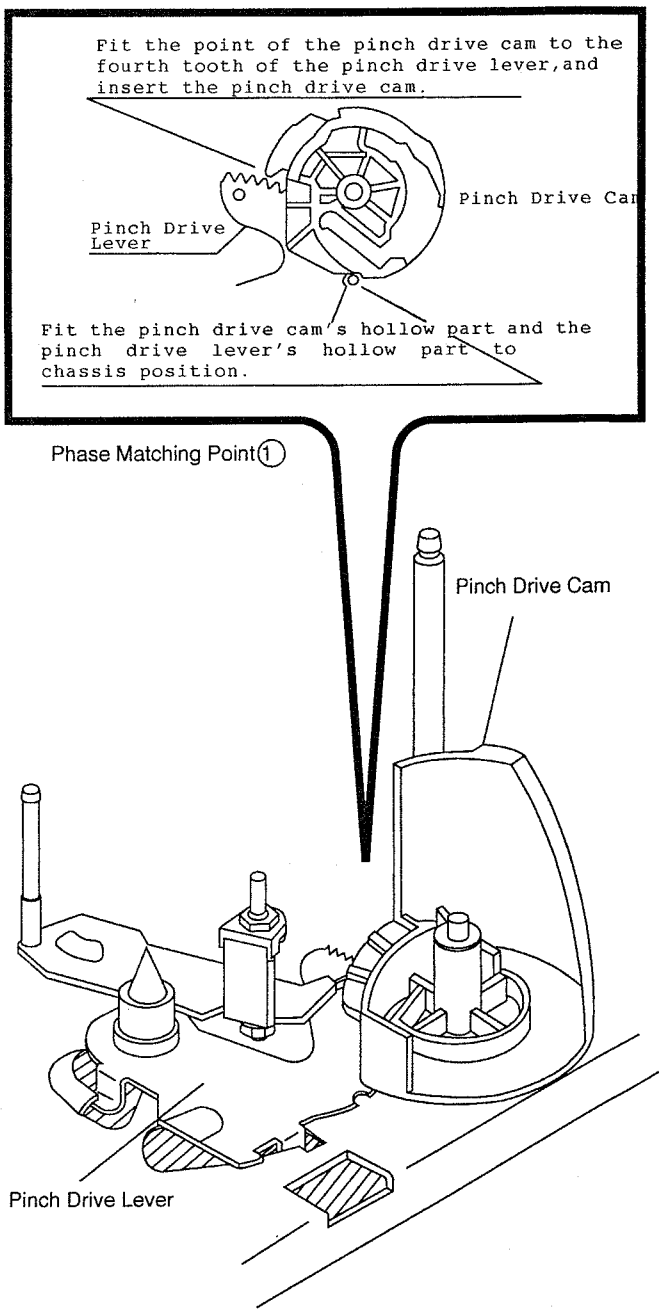

Fit the point of the pinch drive cam to the fourth tooth of the pinch drive lever,and insert the pinch drive cam.
Pinch Drive Cam
Pinch Drive Lever
Fit the pinch drive cam's hollow part and the pinch drive lever's hollow part to chassis position.
Phase Matching Point①
Pinch Drive Cam
Pinch Drive Lever

Figure 4-46-1.

② Insert Pinch Roller/Pinch Double Action Lever Ass'y.

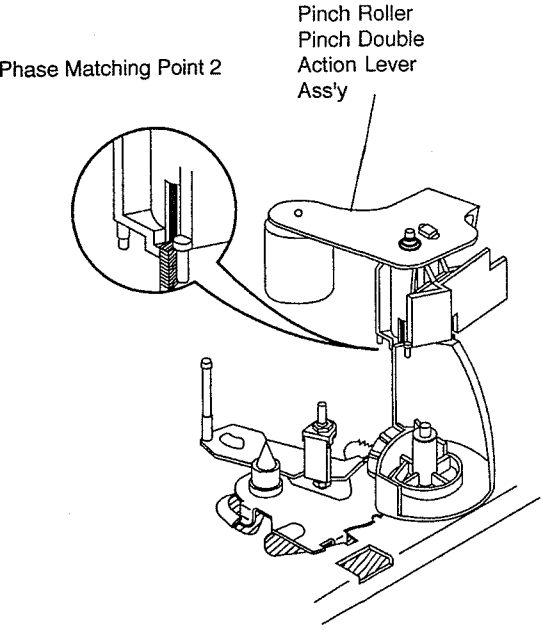


Figure 4-46-2.

③ Insert Open Lever.

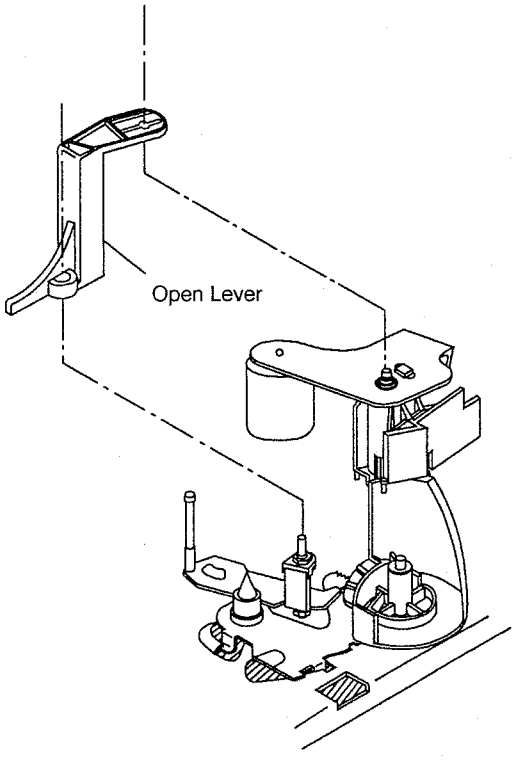


Figure 4-46-3.

2. Mounting the shifter (on the back of the mechanism chassis).

1. Make sure that the loading gear is at the point (1) as shown below.
2. Place the shifter in position, keeping in mind the 7 insertion points and the five relief points.
3. For the phase matching at the insertion point (1), see the point (2) as shown below.
4. Finally fix the shifter with two washers located on insert points ① and ⑥.

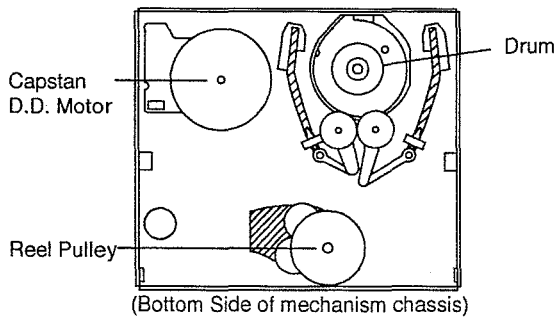


Figure 4-47.

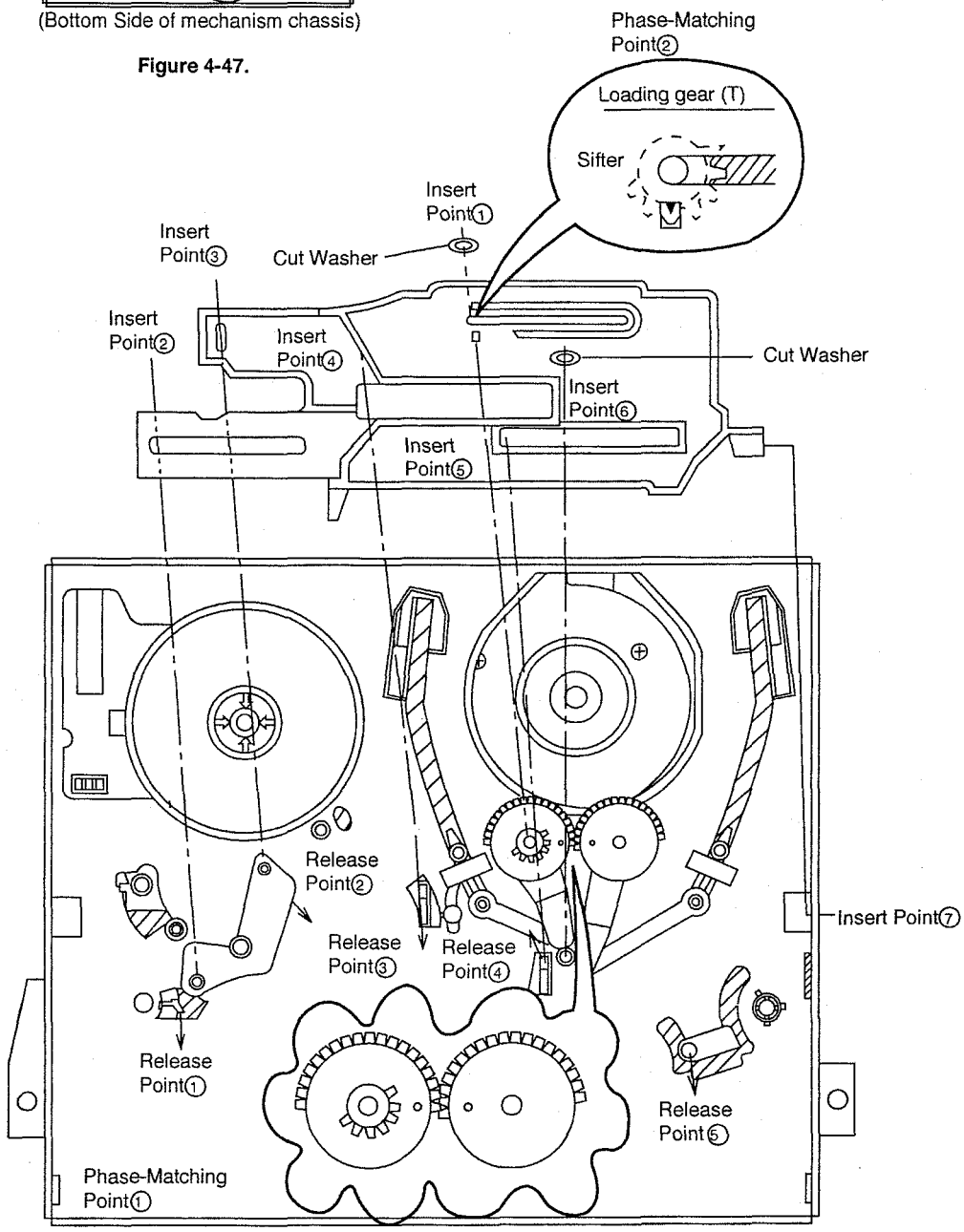


Figure 4-48.

3. Mounting the master cam (on the back of the mechanism chassis).

(1) Make sure beforehand that the shifter is at the point as shown below.
(2) Place the master cam in the position as shown below.

Note:
See the figure below for the phase matching between the master cam and the cassette control drive gear.
(3) Finally fix the master cam with E ring.

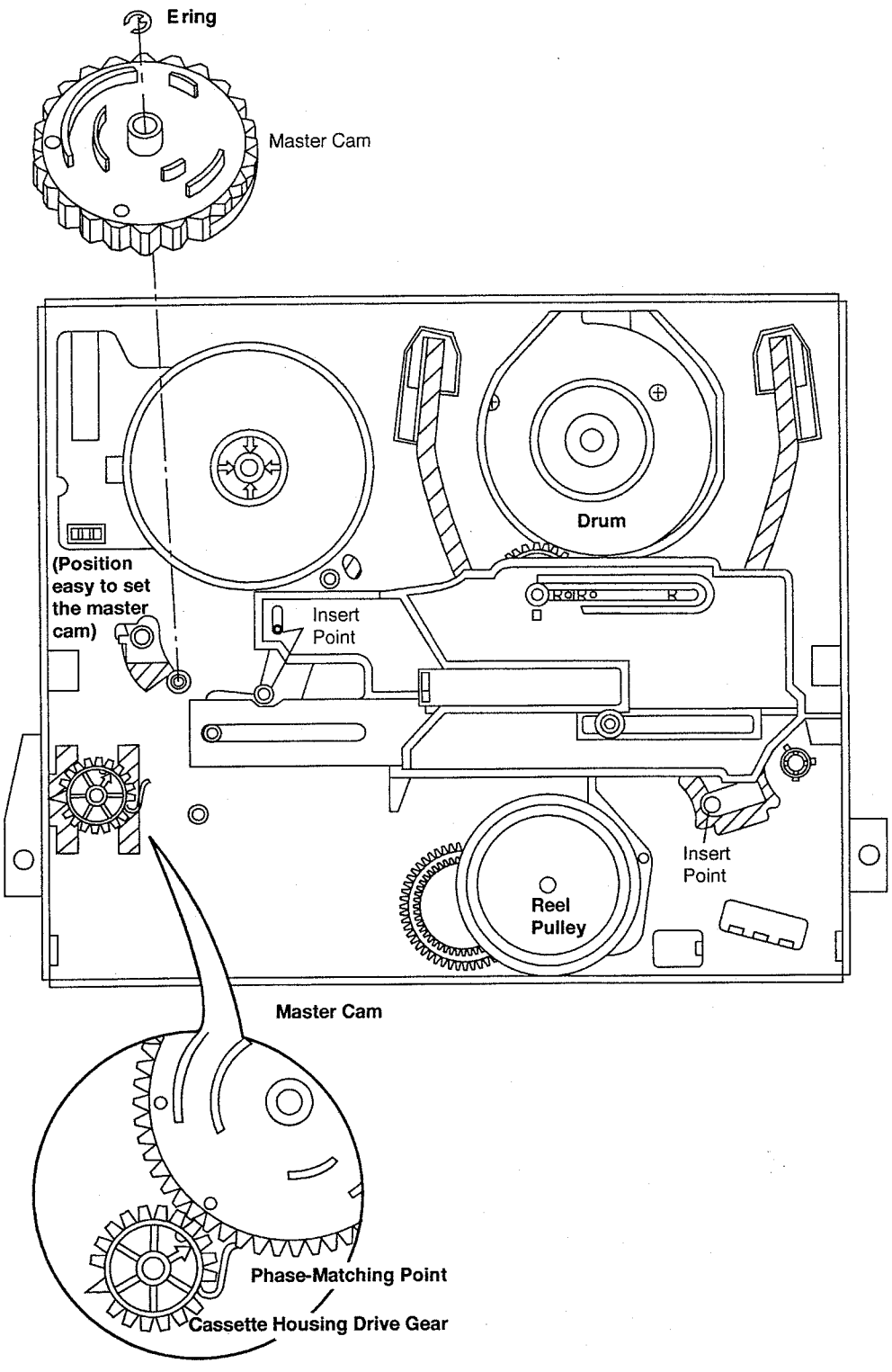


Figure 4-49.

4. Mounting the connection gear, slow brake and loading motor assemblies (on the back of the mechanism chassis).

(1) Assemble the connect gear.
(2) Assemble the slow brake.
(3) Assemble the loading motor unit.

Note:
Let the slow brake leg out of the front of the mechanism chassis. Catch the spring to the take-up fixing guide that is at the left of the A/C head.

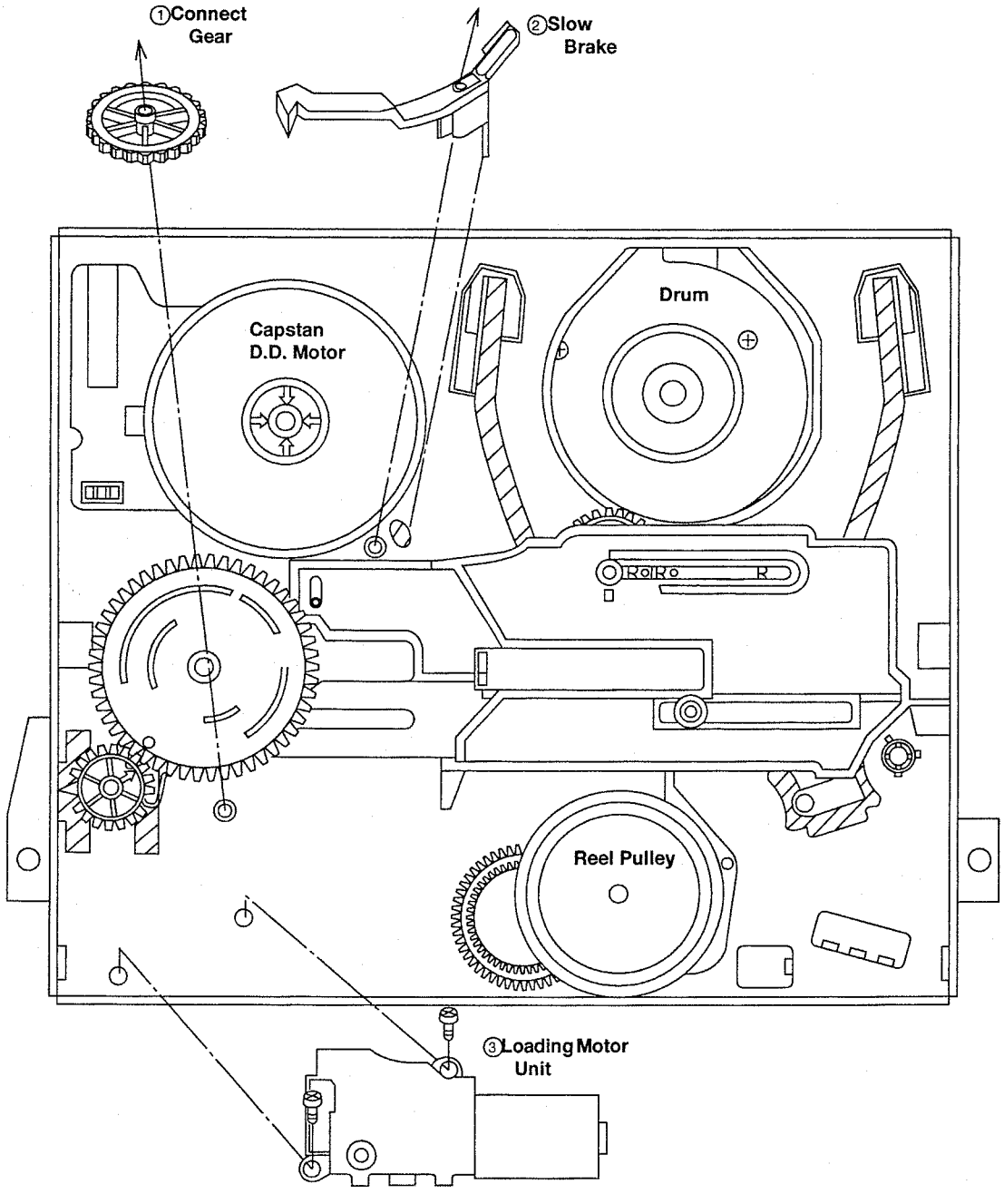


Figure 4-50.

Note:
Before setting up the loading motor, make sure the phase is matched. To do so, turn the connection gear clockwise and check to see if the loading is complete and if the pinch roller comes into contact.

When these actions are made smoothly, return the mechanism to the state as shown above. Finally mount the loading motor unit.

REPLACEMENT OF LOADING MOTOR

- **Removal**

Remove 2 screws.

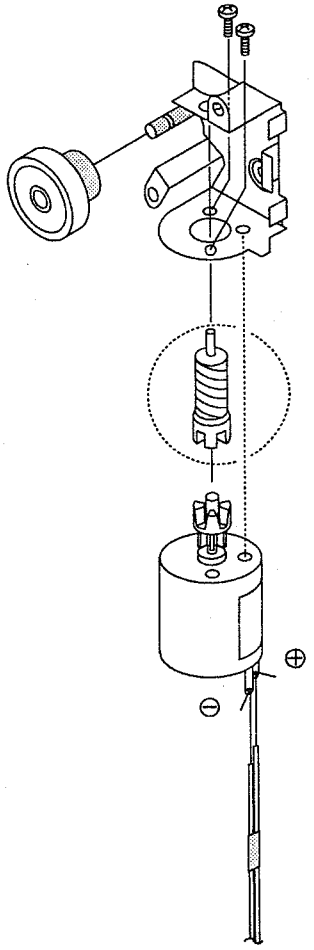
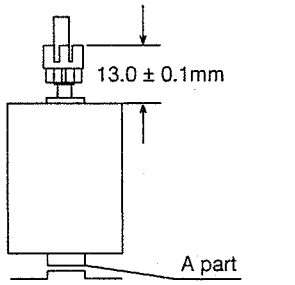


Figure 4-51.

- **Replacement**

Take out the old loading motor. Place a replacement loading motor as shown above (Figure 4-51.).



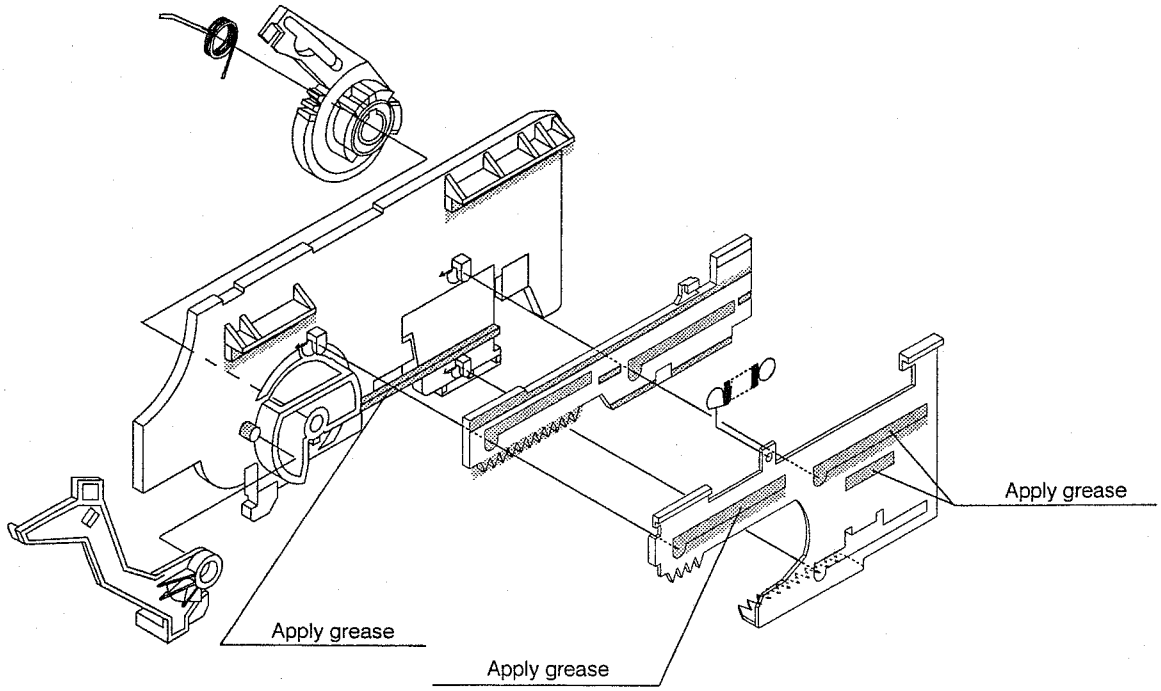
To press the motor in, receive it by portion A.

Figure 4-53.

Press-fit the loading motor pulley with a force of less than 98N (10 kgf). Be sure that the pulley is 13.0 ± 0.1 mm away from the motor.

ASSEMBLY OF CASSETTE HOUSING

① Drive Gear R and Drive Angle Ass'y



Phase Matching Point

- Fix the drive angle ass'y to the drive gear Ras shown in the figure.

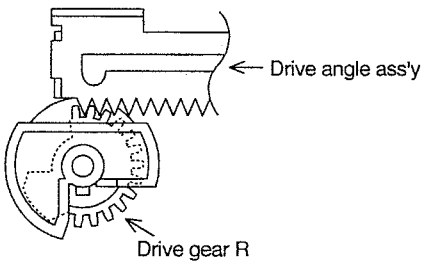


Figure 4-54.

② Synchro Gear, Drive Gear L and Drive Gear R

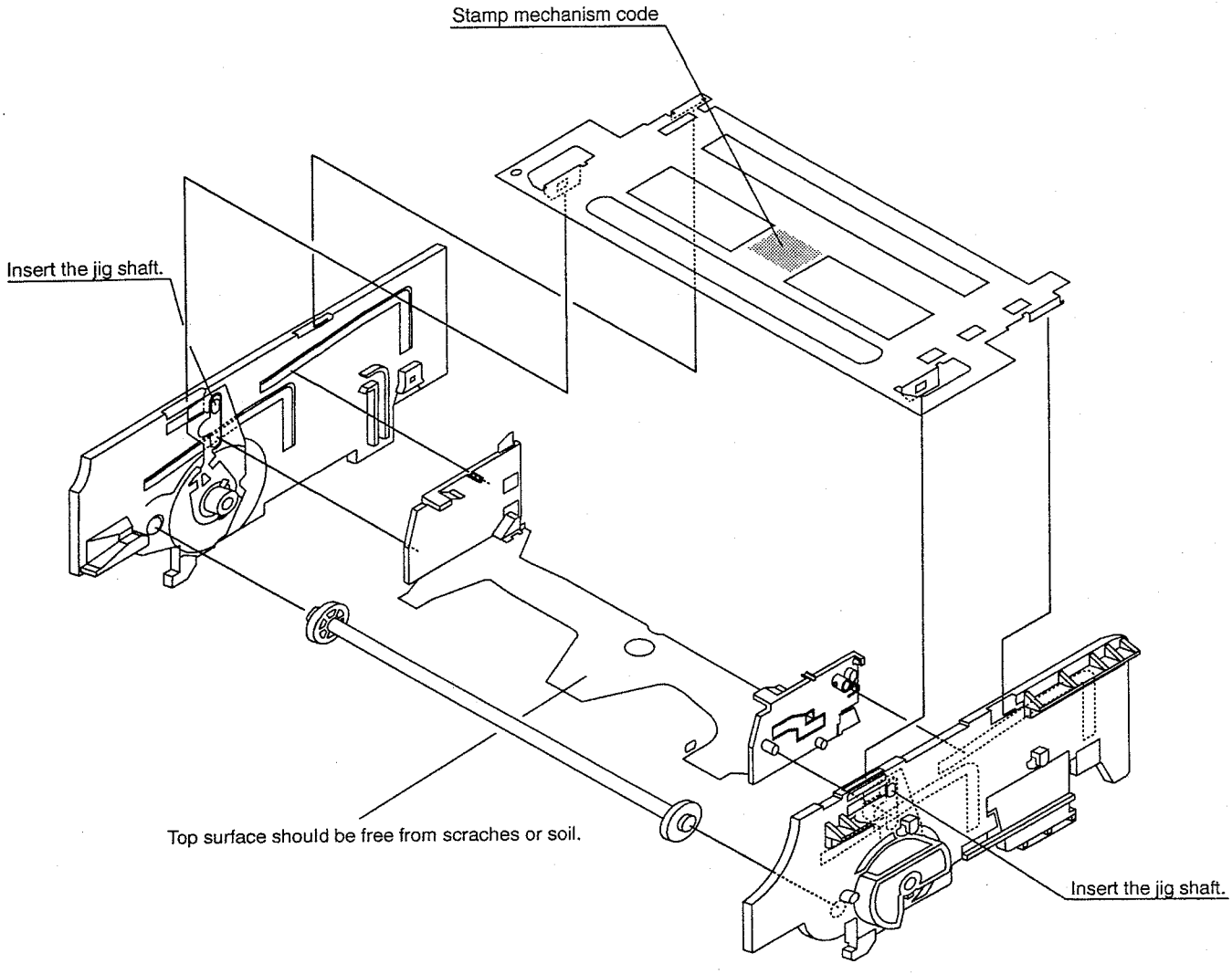


Figure 4-55.

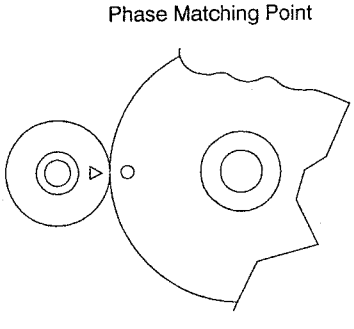


Figure 4-56.

Align the drive gear's round hole with the synchro gear's triangular (Δ) symbol. Do this alignment for both the drive gears.

Note:
Do not over-turn both of the drive gears when the phase has been matched. These gears are partially toothless and might come out of mesh with the synchro gear. In such a case, the phase needs rematching.

5. ELECTRICAL ADJUSTMENT

Notes:

- Before the adjustment:
  Electrical adjustments discussed here are often required after replacement of electronic components and mechanical parts such as video heads.
  Check that the mechanism and all electric components are in good working condition prior to the adjustments, otherwise adjustments can not be completed.

- Instruments required:
  ◎ Colour TV monitor
  ◎ Audio signal generator
  ◎ DC voltmeter
  ◎ Blank video cassette tape
  ◎ Screwdriver for adjustment
  ◎ Colour bar signal generator
  ◎ Dual-trace oscilloscope
  ◎ AC milli-voltmeter
  ◎ Frequency counter
  ◎ Alignment tape
  ◎ Alignment tape
  ◎ Alignment tape

※ Servicing precations
When the IC804 (E^2PROM) has been replaced, make the following reprogramming. Depending on models, the IC804 (E^2PROM) has been factory-adjusted for it's memory function.
It's therefore necessary to reprogram the memory function for the model in question.
Note that the servo circuit requires readjustments for the head switching point, slow and still modes.

- **Location of controls and test points**

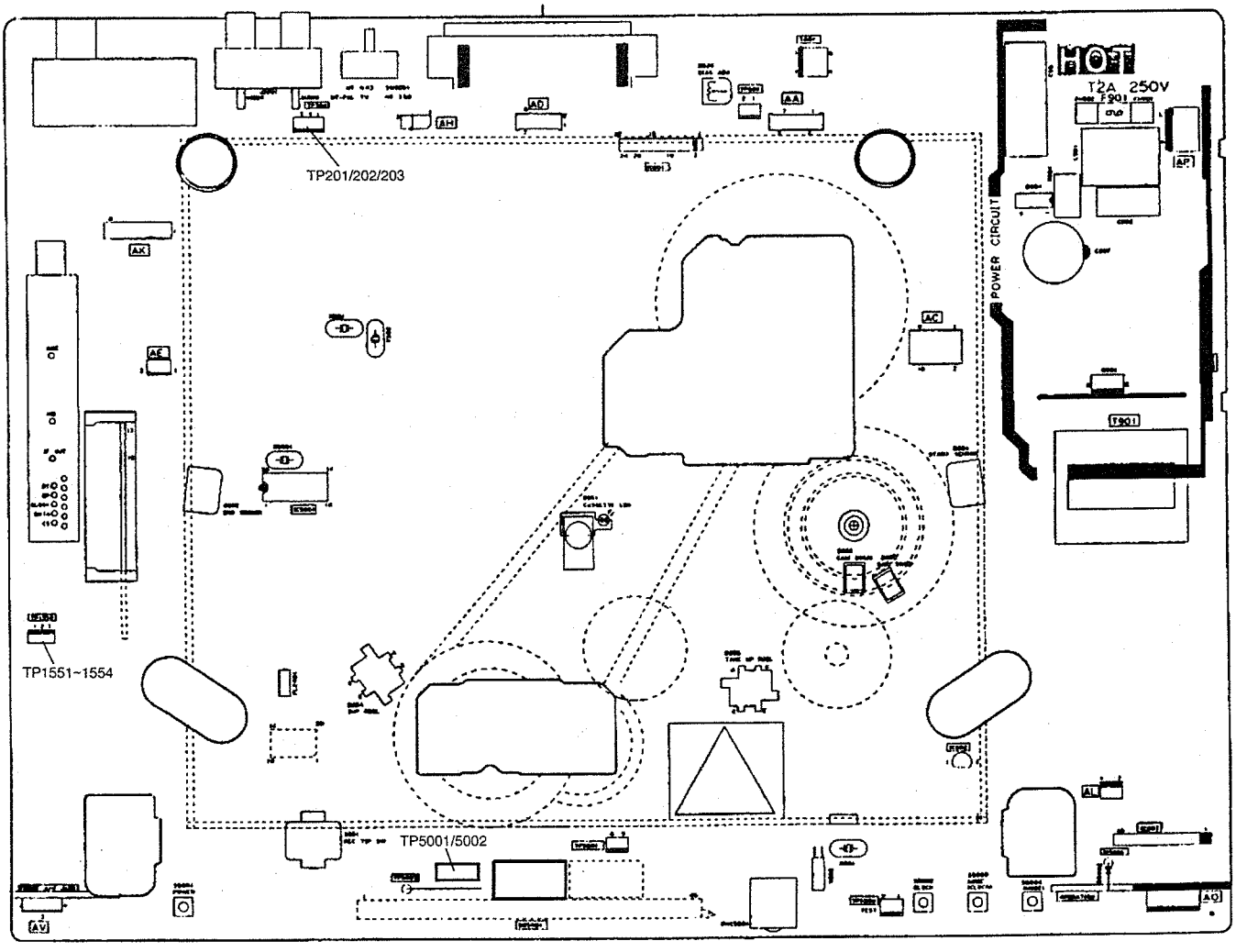


Figure 5-1.

SERVO CIRCUIT ADJUSTMENT

ADJUSTMENT OF HEAD SWITCHING POINT

Measuring instrument	Dual-trace oscilloscope Colour TV monitor
Mode	Playback
Cassette	Alignment tape (VROCPSV)
Test point	2 pin of TP201 (H.SW.P.) to CH-1, VIDEO OUT jack to CH-2 (CH-1 trigger slope switch at (+), Internal trigger at CH-1 side.)
Specification	6.5 ± 0.5H (lines)

1. Remove the front panel and play the alignment tape. (Playback picture on the monitor screen.)
2. Press the TEST switch S5005
   Be sure that all the fluorescent display tubes light up into the TEST mode.
   (See Note below)
3. Press the PLAY button.
   Be sure the "PLAY" appears in the fluorescent display tubes flashing (about 1Hz) into the auto PG adjustment operating.
   Note:
   When the manual PG adjustment is made, observe the waveform with an oscilloscope and make an adjustment to the FF or REW button to bring into specification.
4. Wait until the "PLAY" has stopped flashing after adjustment.
5. Press the STOP button to return to normal mode.
6. Check the waveform on the oscilloscope screen as shown in Figure 5-2. after the head switching point has been adjusted.

Note:

① Set-up of TEST mode.
During the adjustment of HEAD SWITCHING POINT, AUTO TRACKING function is invalid.

② When the cassette housing control ass'y is removed, set-up of mechanism operating mode.

1) Replug the AC power cord it a few minutes later.
2) Make a connection between TP5001 and TP5002, both located at the front side on the main PWB with a 22 ohm resistor, to center the tracking.
3) AC power cord is plugged in.
4) With the AC power cord replugged, the mechanism operating mode will resume.

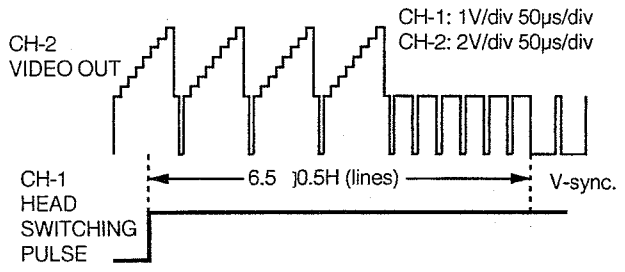


Figure 5-2.

ADJUSTMENT OF SLOW TRACKING PRE-SET (2 HEAD MODELS)

Measuring instrument	Colour TV monitor
Mode	Playback
Cassette	Self-recorded tape (See Note below)
Control	Tracking control buttons (+) or (–)
Specification	Minimized noise on monitor screen

1. Have the unit to receive a good TV broadcast or feed a video signal to the VIDEO IN jack. (See note 2 below)
2. Record the signal on tape.
3. Rewind and play the tape where signal was recorded in above step.
4. Press the SLOW button on the remote control,and playback the recorded portion in the slow mode.
5. Press the TEST switch S5005
   Be sure that all the fluorescent display tubes light up into the TEST mode.
6. Look at the monitor screen and adjust the (+) or (–) TRACKING buttons so that the noise disappears from the screen.
7. Press the STOP button to return to normal mode.
8. Play the tape a few seconds then press the SLOW button again and make sure there is on noise in the screen.

Notes:

① Self-recorded tape means a cassette whose program was recorded by the unit being adjusted.

② The TV program will not be recorded if RCA or 21pin plugs are pluged in to the AUDIO/VIDEO input terminals.

ADJUSTMENT OF SP/LP SLOW TRACKING PRESET (4 HEAD MODELS)

Measuring instrument	Colour TV monitor
Mode	Playback
Cassette	Self-recorded tape (SP/LP mode) (See Note below)
Control	Tracking control buttons (+) or (–)
Specification	Minimized noise on monitor screen

1. Have the unit to receive a good TV broadcast or feed a video signal to the VIDEO IN jack. (See note 2 below)
2. Set the tape speed in SP mode by using the remote control and record the signal on tape.
3. Rewind and play the tape where signal was recorded in above step.
4. Press the SLOW button on the remote control,and playback the recorded portion in the slow mode.
5. Press the TEST switch S5005.
   Be sure that all the fluorescent display tubes light up into the TEST mode.
6. Look at the monitor screen and adjust the (+) or (–) TRACKING buttons so that the there is noise disappears from the screen.
7. Press the STOP button to return to normal mode.
8. Play the tape a few seconds then press the SLOW button again and make sure there is no noise in the screen.
   (For the LP mode put adjustment at the same adjustment way as SP mode.)

Notes:

① Self-recorded tape means a cassette whose program was recorded by the unit being adjusted.

② The TV program will not be recorded if RCA or 21pin plugs are pluged in to the AUDIO/VIDEO input terminals.

ADJUSTMENT OF FV (False Vertical Sync) OF STILL PICTURE (2 HEAD MODELS)

Measuring instrument	Colour TV monitor
Mode	Playback still
Cassette	Self-recorded tape (See Note below②)
Control	Tracking control buttons (+) or (–)
Specification	No vertical jitter of picture

1. Play a cassette which was recorded.
2. Press the PAUSE/STILL button to freeze the picture.
3. Look at the monitor screen and adjust (+) or (–) TRACKING buttons so that the vertical jitter of the picture to be minimized.
4. Play and freeze the self-recorded tape and make sure vertical jitter of the picture is not noticeable.

Note:

① The FV goes back to the initial state when the unit is put into the system controller reset mode due to power failure, etc.
In this case, preset the FV once again.

② Self-recorded tape is a cassette whose program was recorded by the unit being adjusted.

ADJUSTMENT OF FV(False Vertical Sync) OF STILL PICTURE (4 HEAD MODELS)

Measuring instrument	Colour TV monitor
Mode	Playback still
Cassette	Self-recorded tape (SP mode) (See Note below②)
Control	Tracking control buttons (+) or (–)
Specification	No vertical jitter of picture

1. Play a cassette which was recorded by the unit in SP mode.
2. Press the PAUSE/STILL button to freeze the picture.
3. Look at the monitor screen and adjust (+) or (–) TRACKING buttons so that the vertical jitter of the picture to be minimized.
4. Play and freeze the self-recorded tape in SP mode and make sure vertical jitter of the picture is not noticeable.
   (For the LP mode put adjustment at the same adjustment way as SP mode.)

Note:

① The FV goes back to the initial state when the unit is put into the system controller reset mode due to power failure, etc.
In this case, preset the FV once again.

② Self-recorded tape is a cassette whose program was recorded by the unit being adjusted.

Y/C CIRCUIT ADJUSTMENT

CHECKING OF VIDEO E-E LEVEL

Measuring instrument	Oscilloscope
Mode	E-E or Record
Input signal	EIA colour bar (1.0Vp-p)
Test point	VIDEO OUT jack
Specification	1.0 ± 0.1Vp-p

1. Connect a 75 ohm terminating resistor to the VIDEO OUT jack and connect an oscilloscope across this terminating resistor. (See Note below.)
2. Feed a colour bar signal to the VIDEO IN jack.
3. Make sure that the E-E signal amplitude is 1.0Vp-p as shown in Figure 5-3.

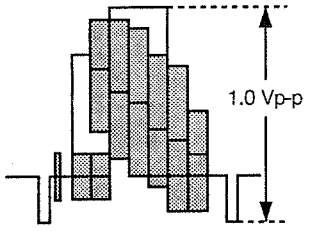


Figure 5-3.

Notes:
If the 75 ohm terminating resistor is missing, the signal amplitude will be doubled.

CHECKING OF WHITE CLIP LEVEL

Measuring instrument	Oscilloscope
Mode	E-E or Record
Input signal	EIA colour bar (1.0Vp-p)
Test point	Pin(48) of IC401, GND
Specification	190 ± 5% (See note below)

1. Connect a oscilloscope to pin(48) of IC401 and GND.
2. Feed the colour bar signal to the VIDEO IN jack and set the unit in E-E or recording mode.
3. Make sure that the overshoot of the video signal is clipped at 190% as shown in Figure 5-4.

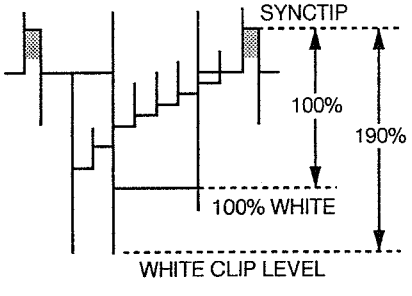


Figure 5-4.

Note:
From sync tip to white peak, the level is 100%.
The white clip level is 90% above the white level.

CHECKING OF RECORD LEVEL

Measuring instrument	Dual-trace oscilloscope
Mode	Record mode
Input signal	EIA colour bar (1.0Vp-p)
Test point	Chroma (Red) R515 terminal lead at L509 side (Sig.) ~ GND Sync tip R226 terminal lead at L210 side (Sig.) ~ GND
Specification	Chroma (Red): 205~290mVp-p Sync tip: 360~440mVp-p

1. Feed the colour bar signal to the VIDEO IN jack and set the unit in recording mode.
2. Connect a dual -trace oscilloscope to each test point shown in table.
3. Make sure that the amplitude of the chrome (Red) portion and the sync tip portion are specified as shown in Figure 5-5

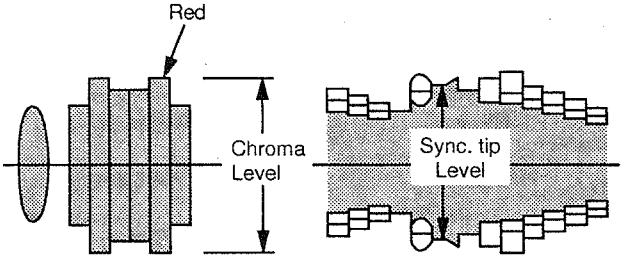


Figure 5-5 (a). **Figure 5-5 (b).**

CHECKING OF PLAYBACK LEVEL

Measuring instrument	Oscilloscope
Mode	Record/Playback
Input signal	EIA colour bar (1.0Vp-p)
Test point	VIDEO OUT jack
Specification	1.0 ± 0.1Vp-p

1. Be sure that E-E level has been correctly specificed.
2. Connect a 75 ohm terminating resistor to the VIDEO OUT jack and connect an oscilloscope across this terminating resistor.
   (See Note below.)
3. Feed a colour bar signal to the VIDEO IN jack and set the unit in recording mode.
4. Play the colour bar portion of the recorded tape.
5. Make sure that the output signal amplitude is 1.0Vp-p as shown in Figure 5-6.

Note:
If the 75 ohm terminating resistor is missing, the signal amplitude will be doubled.

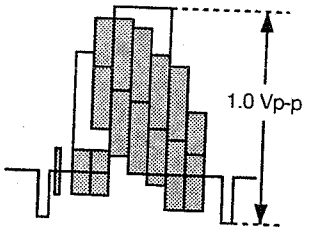


Figure 5-6.

UDIO CIRCUIT

HECKING OF E-E LEVEL

Measuring nstrument	AC milli-voltmeter
Mode	E-E/Record
Input signal	1kHz, –8.0dBs (at RCA type jack) 1kHz, –3.8dBs (at 21pin type jack)
Test point	AUDIO OUT jack
Specification	–8.0 ± 2dBs (at RCA type jack) –3.8 ± 2dBs (at 21pin type jack)

. Connect an oscilloscope to the AUDIO OUT jack.
. Feed the audio signal shown in table to the AUDIO IN jack.
. Put the unit in E-E or recording mode.
. Make sure that the output level is value shown in table.

CHECKING OF AUDIO PLAYBACK LEVEL

Measuring instrument	AC milli-voltmeter
Mode	Playback
Input signal	Alignment tape. (1kHz level conrtol signal.)
Test point	AUDIO OUT jack
Specification	$-9\ ^{+2dB}_{-1dB}$

1. Playback the Alignment tape. (1kHz level audio signal)
2. Connect an AC milli-voltmeter to the AUDIO OUT jack.
3. Make sure that the output level is value shown in table.

CHECKING OF AUDIO RECORD LEVEL

Measuring instrument	AC milli-voltmeter
Mode	Record/playback
Input signal	1kHz, –8.0dBs (at RCA type jack) 1kHz, –3.8dBs (at 21pin type jack)
Test point	AUDIO OUT jack
Specification	–8.0 ± 3dBs (at RCA type jack) –3.8 ± 3dBs (at 21pin type jack)

1. Connect an oscilloscope to the AUDIO OUT jack.
2. Feed the audio signal shown in table to the AUDIO IN jack.
3. Make the self-recording and playback of the signal.
4. Make sure that the output level is value shown in table. If it's out of specified value, verify the bias current (CHECKING OF AUDIO BIAS CURRENT below).

CHECKING OF AUDIO BIAS CURRENT

Measuring instrument	AC milli-voltmeter
Mode	Record
Input signal	Not required
Test point	TP601 (+) ~ TP602 (–) (Copper side)
Specification	2.5 ± 0.1mVrms

1. Connect an AC milli-voltmeter to TP601 (+) and TP602 (–).
   (Use TP602 for ground lead.)
2. Put the unit in recording mode.
3. Make sure that the AC milli-voltmeter reads 2.5 ± 0.1mVrms.

CHECKING OF ERASE VOLTAGE AND OSCILLATION FREQUENCY

Measuring instrument	Oscilloscope
Mode	Record
Test point	Full erase head
Control	T601
Specification	70 ± 5kHz,40Vp-p or greater

1. Put the unit in recording mode.
2. Connect an oscilloscope across the full erase head.
3. Make sure the erase voltage across the full erase head is approx. 40Vp-p or more and frequency is 70 ± 5kHz.

RF CIRCUIT

ADJUSTMENT OF RF AGC CIRCUIT (For G/S/H version)

Measuring instrument	DC voltmeter and VHF signal generator
Mode	RF signal at E12-CH (by VHF signal generator) (EBU colour bar signal at 87.5% modulated.)
Test point	TP1551 (Sig.) TP1553 (GND)
Control	VR001 AGC control
Specification	4.5 ± 0.1V

1. Receive the E12 channel signal(colour bar signal at 87.5% modulated.) at Input field strength: 70dBμV of antenna terminal.
2. Connect a DC voltmeter to test points shown in table.
3. Adjust VR001 (AGC control) in the IF pack so that the voltage be specified.

RF CIRCUIT

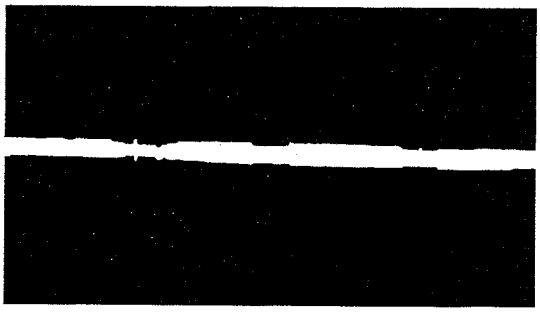
ADJUSTMENT OF RF AGC CIRCUIT (UK models only)

Measuring instrument	DC voltmeter and UHF signal generator
Mode	RF signal at I-69-CH (by UHF signal generator) (EBU colour bar signal at 87.5% modulated.)
Test point	TP1551 (Sig.) TP1553 (GND)
Control	VR001 AGC control
Specification	4.5 ± 0.1V

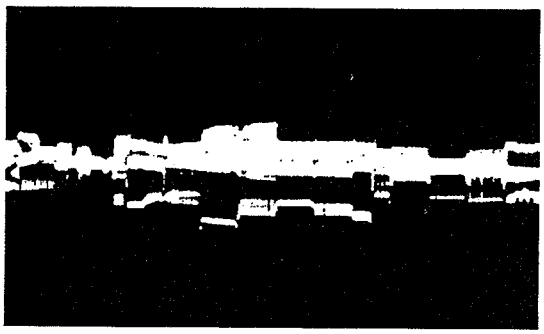
1. Receive the I-69 channel signal(colour bar signal at 87.5% modulated.) at Input field strength: 51dBμV of antenna terminal.
2. Connect a DC voltmeter to test points shown in table.
3. Adjust VR001 (AGC control) in the IF pack so that the voltage be specified.

SORT TV ADJUSTMENT PROCEEDURE.

1. Tune the VCR Pr1 to the test signal. (Preferably a fixed pattern) .
2. Tune the TV Pr1 to the test signal.
3. Tune the TV Pr2 to any other signal.
4. Set TV back to Pr1.
5. Select E1 on the VCR.
6. Connect an oscilloscope probe to test point TP5802.
7. Adjust R5809 until the signal level is at a minimum.



8. Select TV Pr2. Check that the signal level is greater than in Step 7 above.

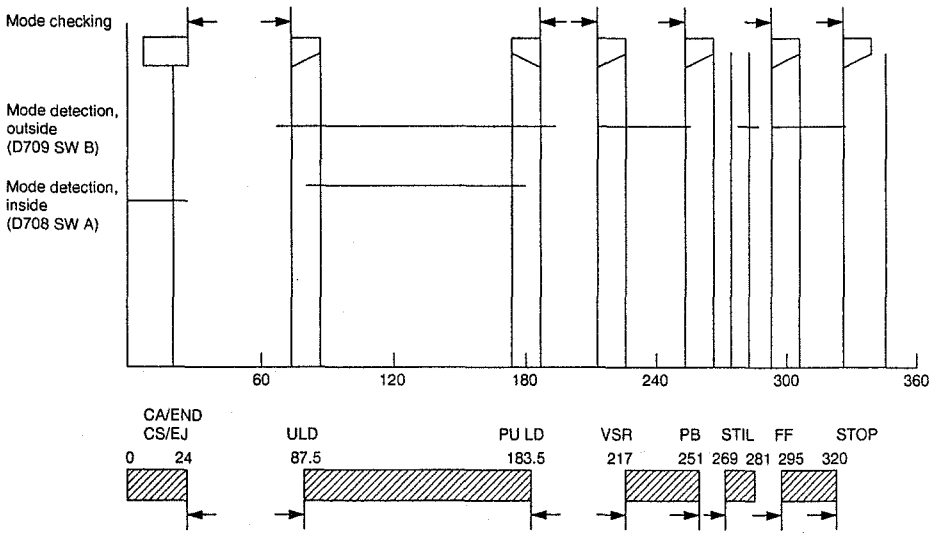


Please note: The test signal on TV Pr1 and the normal signal on TV Pr2 MUST be completely different.

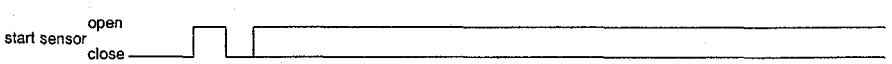
MECHANISM OPERATION FLOWCHART

* This flowchart describes the outline of the mechanism's operation, but does not give its details.

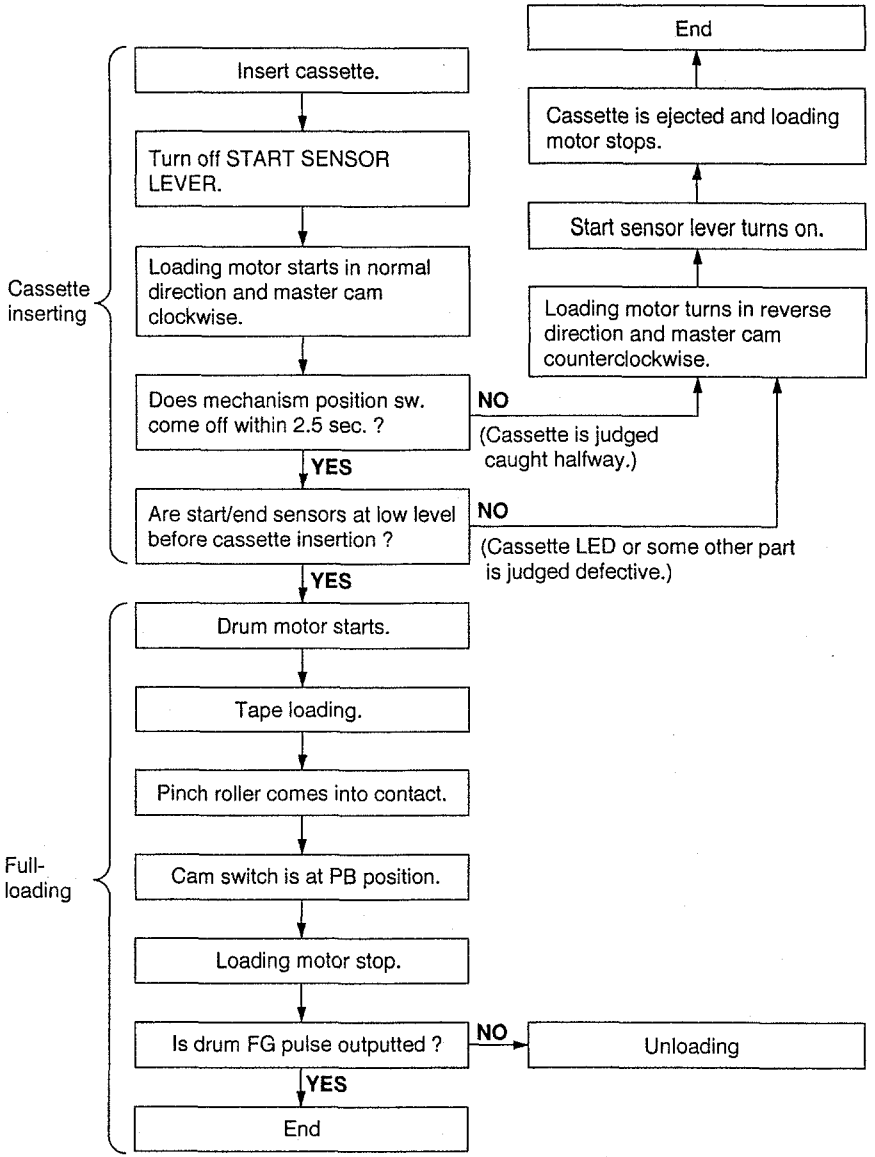
Cam movement chart



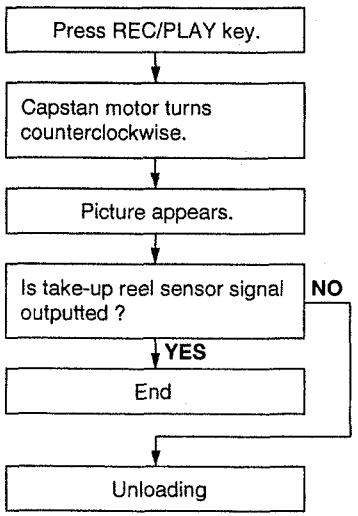
	CS/EJ						ULD	PU LD		VSR	PB	STL		FF	STOP
Mode detection, outside	0	0	0	0	0	1	1	1	1	0	1	1	0	1	1	0
Mode detection, inside	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
S sensor	1	1	0	1	1 or 0											



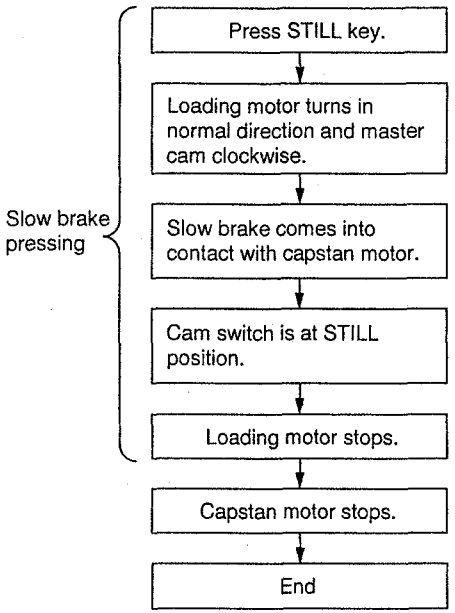
CASSETTE INSERTION / STOP


Insert cassette.
Turn off START SENSOR LEVER.
Loading motor starts in normal direction and master cam clockwise.
Does mechanism position sw. come off within 2.5 sec. ?
NO
(Cassette is judged caught halfway.)
YES
Are start/end sensors at low level before cassette insertion ?
NO
(Cassette LED or some other part is judged defective.)
YES
Cassette inserting
Drum motor starts.
Tape loading.
Pinch roller comes into contact.
Cam switch is at PB position.
Loading motor stop.
Is drum FG pulse outputted ?
NO
Unloading
YES
End
Full-loading
Loading motor turns in reverse direction and master cam counterclockwise.
Start sensor lever turns on.
Cassette is ejected and loading motor stops.
End

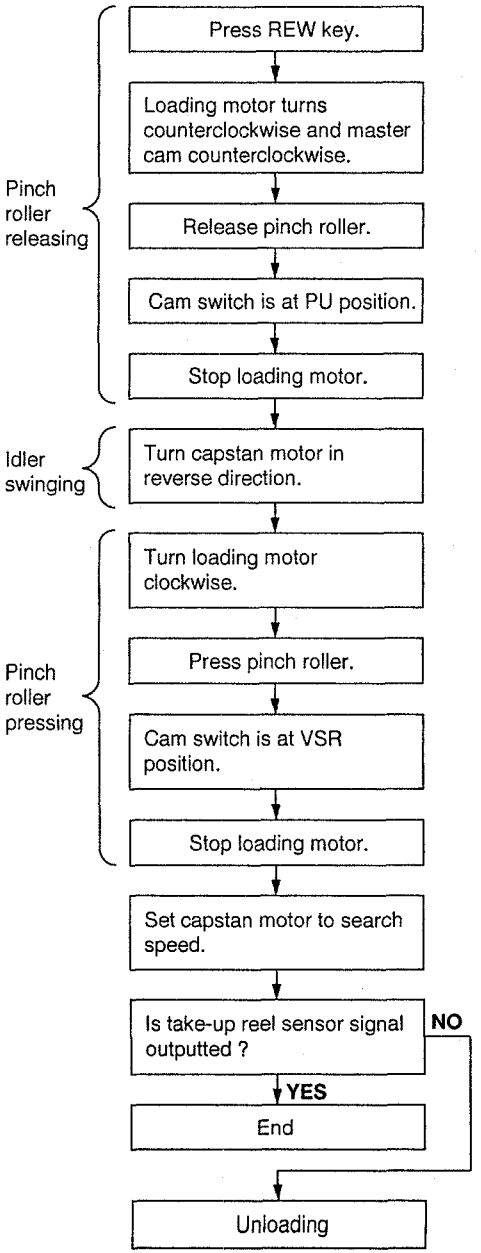
STOP / REC/PLAY



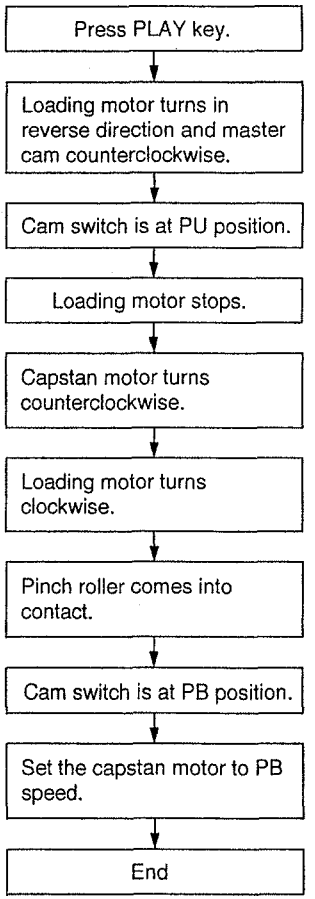
PLAY / STILL


Slow brake pressing
Press STILL key.
Loading motor turns in normal direction and master cam clockwise.
Slow brake comes into contact with capstan motor.
Cam switch is at STILL position.
Loading motor stops.
Capstan motor stops.
End

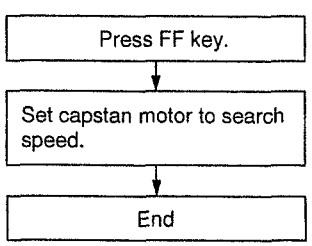
PLAY / VSR



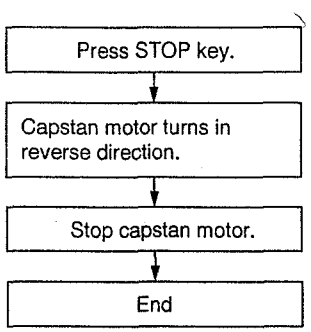
VSR / PLAY


Press PLAY key.
Loading motor turns in reverse direction and master cam counterclockwise.
Cam switch is at PU position.
Loading motor stops.
Capstan motor turns counterclockwise.
Loading motor turns clockwise.
Pinch roller comes into contact.
Cam switch is at PB position.
Set the capstan motor to PB speed.
End

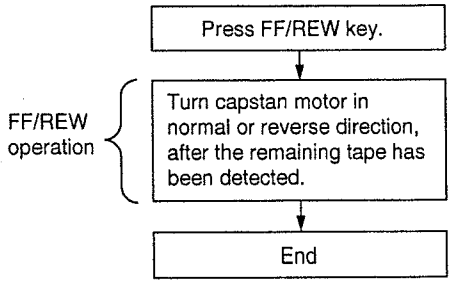
PLAY / VSF



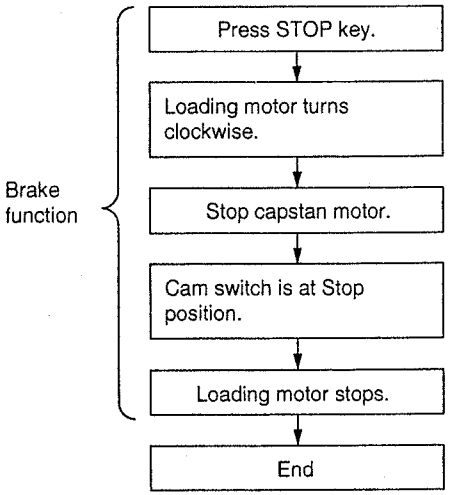
REC/PLAY / STOP



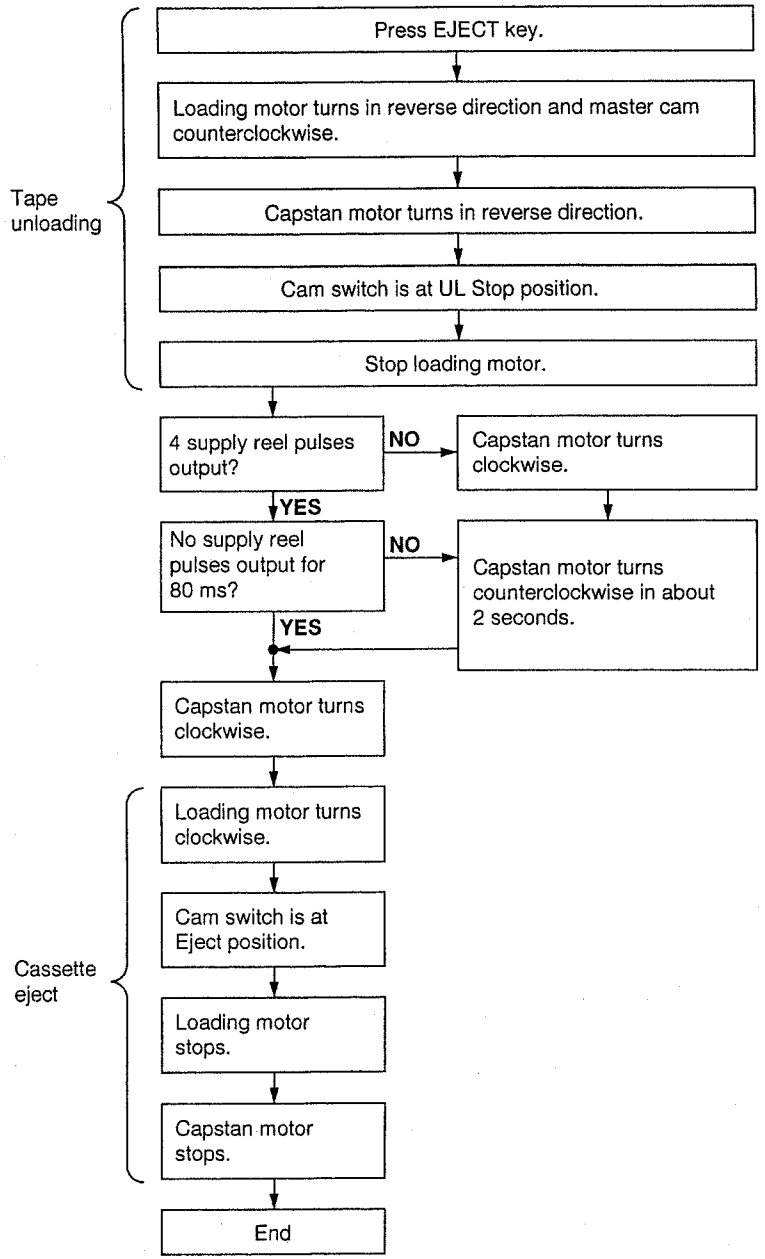
STOP / FF/REW


Press FF/REW key.
FF/REW operation
Turn capstan motor in normal or reverse direction, after the remaining tape has been detected.
End

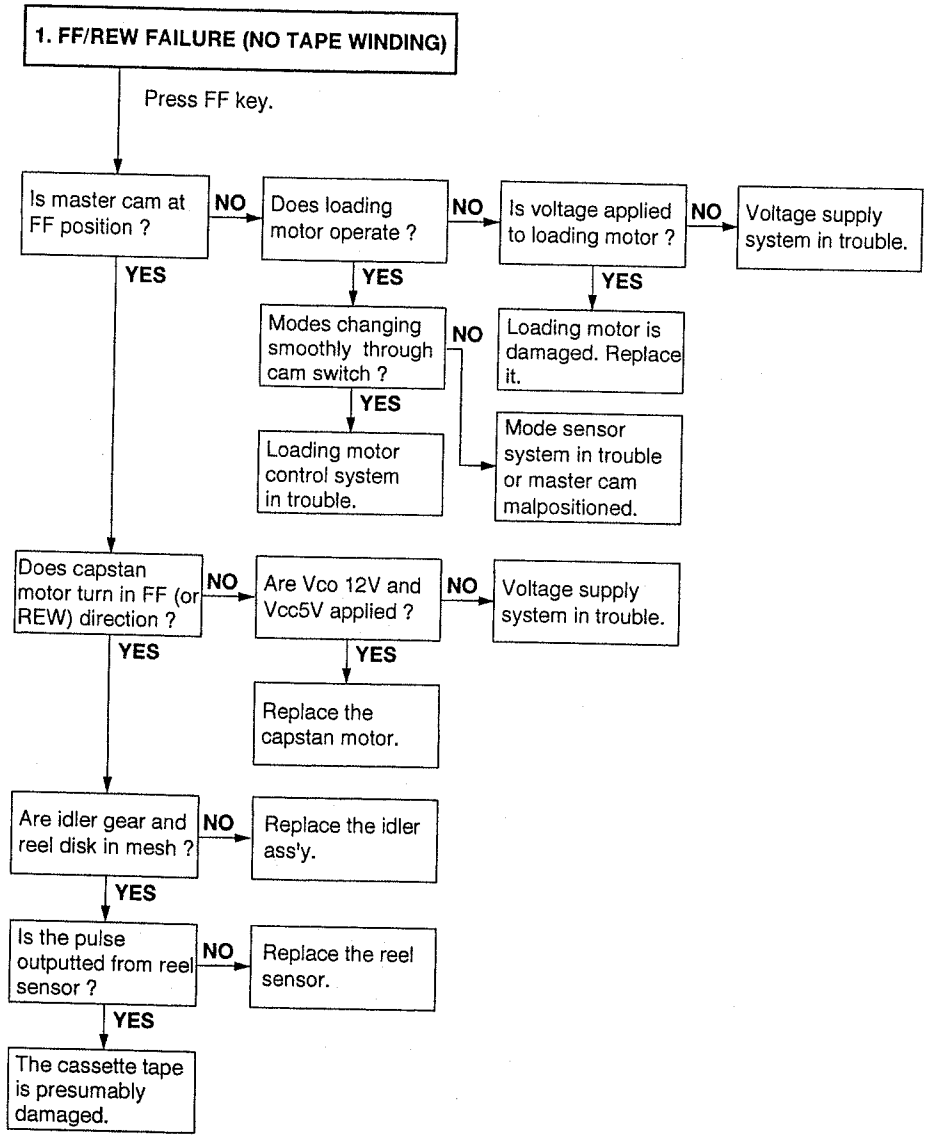
FF/REW / STOP

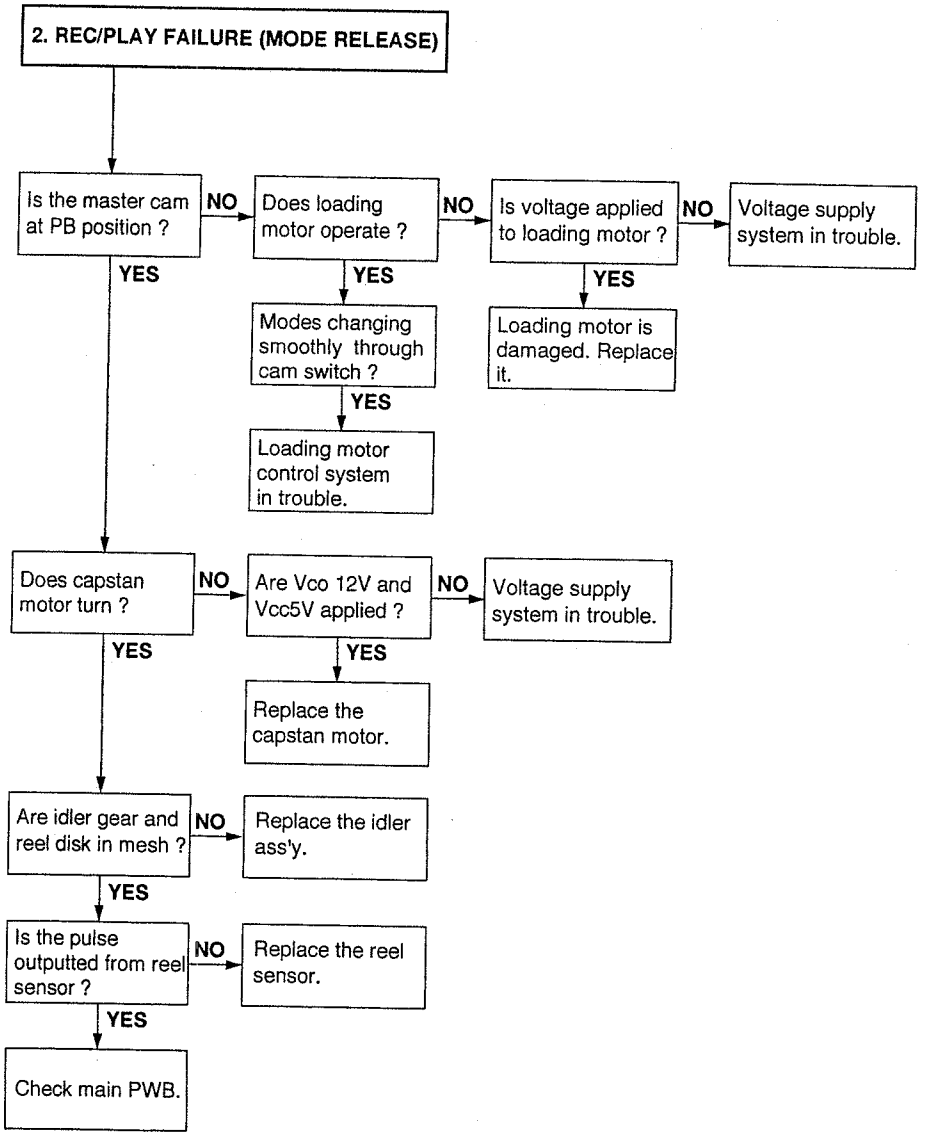


STOP / CASSETTE EJECT

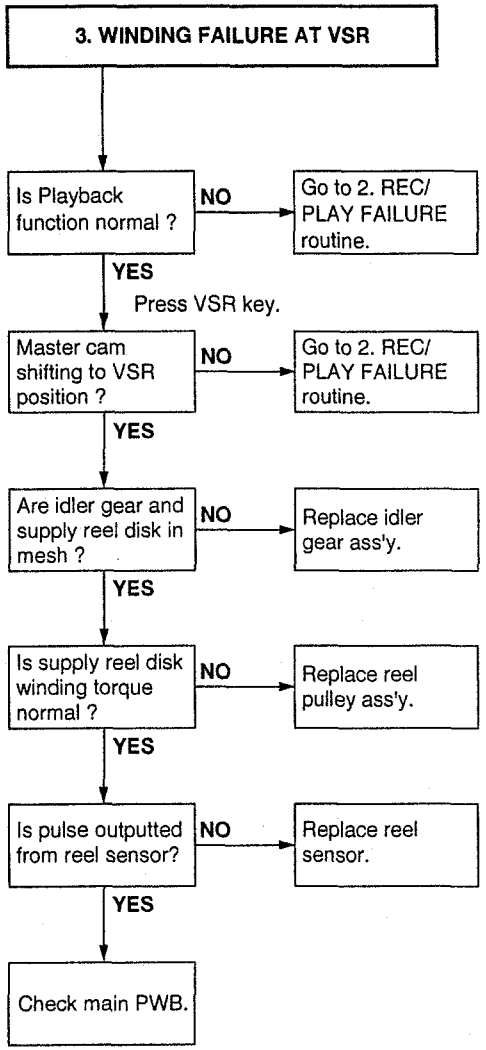

Press EJECT key.
Tape unloading
Loading motor turns in reverse direction and master cam counterclockwise.
Capstan motor turns in reverse direction.
Cam switch is at UL Stop position.
Stop loading motor.
4 supply reel pulses output?
NO
Capstan motor turns clockwise.
YES
No supply reel pulses output for 80 ms?
NO
Capstan motor turns counterclockwise in about 2 seconds.
YES
Capstan motor turns clockwise.
Cassette eject
Loading motor turns clockwise.
Cam switch is at Eject position.
Loading motor stops.
Capstan motor stops.
End

MECHANISM TROUBLESHOOTING

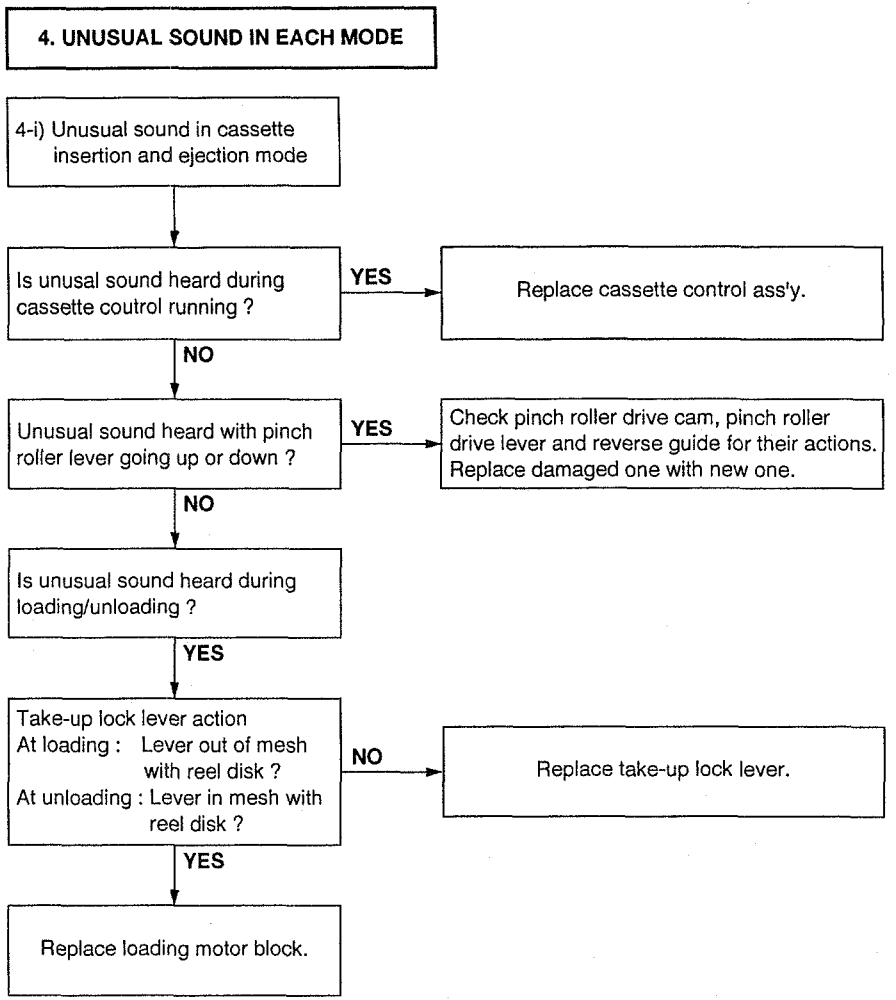


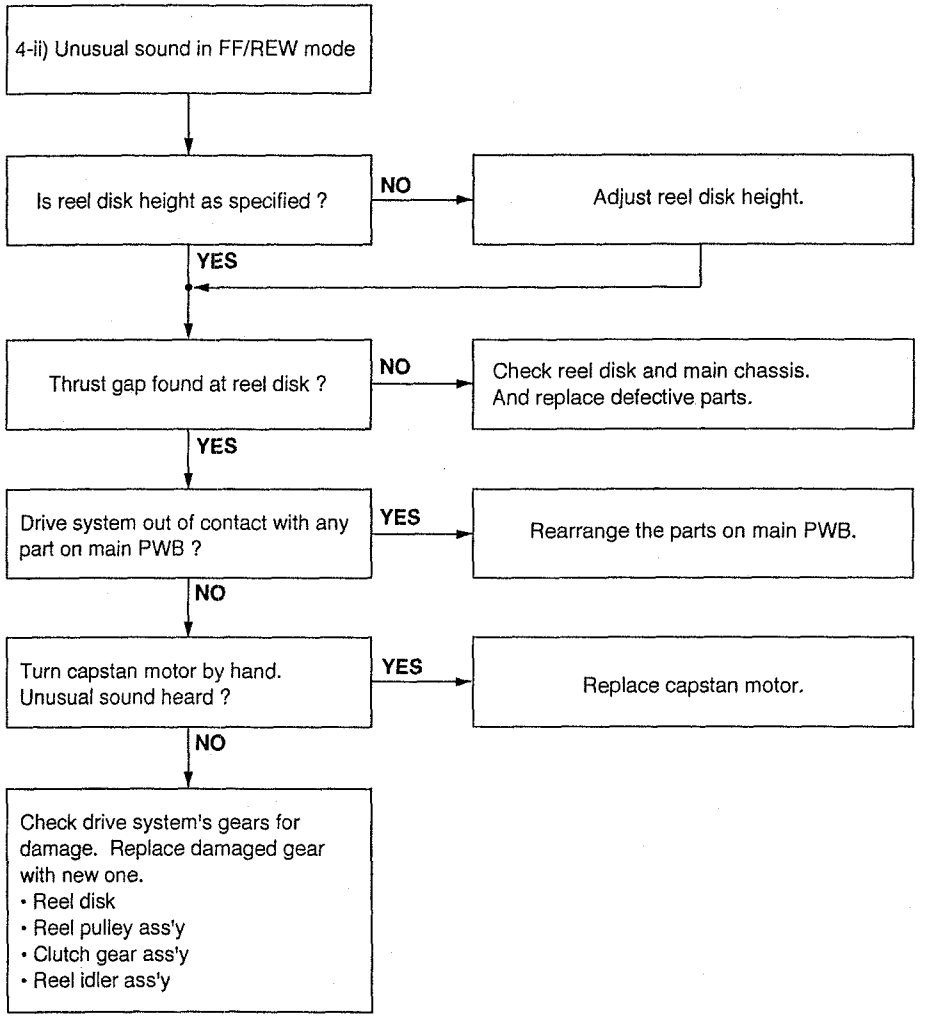


3. WINDING FAILURE AT VSR



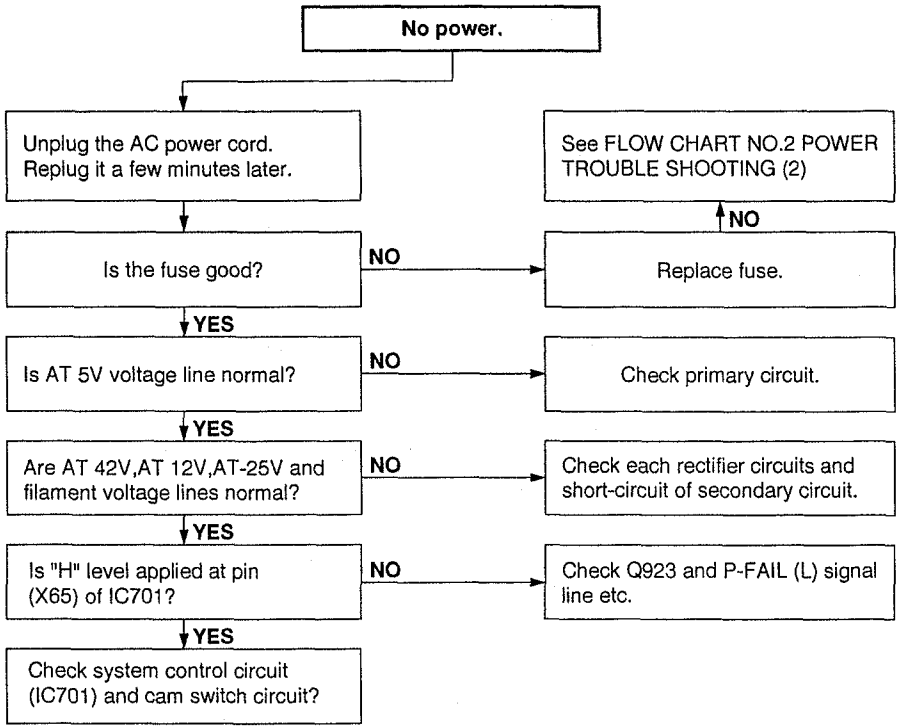
4. UNUSUAL SOUND IN EACH MODE


4-i) Unusual sound in cassette insertion and ejection mode
Is unusal sound heard during cassette coutrol running ?
YES
Replace cassette control ass'y.
NO
Unusual sound heard with pinch roller lever going up or down ?
YES
Check pinch roller drive cam, pinch roller drive lever and reverse guide for their actions. Replace damaged one with new one.
NO
Is unusual sound heard during loading/unloading ?
YES
Take-up lock lever action
At loading : Lever out of mesh with reel disk ?
At unloading : Lever in mesh with reel disk ?
NO
Replace take-up lock lever.
YES
Replace loading motor block.

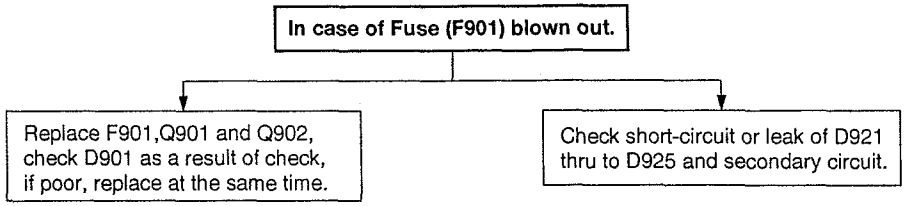

4-ii) Unusual sound in FF/REW mode
Is reel disk height as specified ?
NO
Adjust reel disk height.
YES
Thrust gap found at reel disk ?
NO
Check reel disk and main chassis.
And replace defective parts.
YES
Drive system out of contact with any part on main PWB ?
YES
Rearrange the parts on main PWB.
NO
Turn capstan motor by hand.
Unusual sound heard ?
YES
Replace capstan motor.
NO
Check drive system's gears for damage. Replace damaged gear with new one.
• Reel disk
• Reel pulley ass'y
• Clutch gear ass'y
• Reel idler ass'y

7. TROUBLESHOOTING

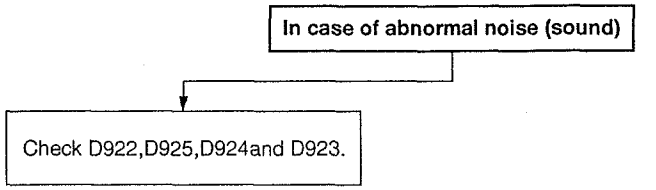
FLOW CHART NO.1 POWER TROUBLESHOOTING (1)


No power.
Unplug the AC power cord.
Replug it a few minutes later.
See FLOW CHART NO.2 POWER TROUBLE SHOOTING (2)
NO
Is the fuse good?
NO
Replace fuse.
YES
Is AT 5V voltage line normal?
NO
Check primary circuit.
YES
Are AT 42V,AT 12V,AT-25V and filament voltage lines normal?
NO
Check each rectifier circuits and short-circuit of secondary circuit.
YES
Is "H" level applied at pin (X65) of IC701?
NO
Check Q923 and P-FAIL (L) signal line etc.
YES
Check system control circuit (IC701) and cam switch circuit?

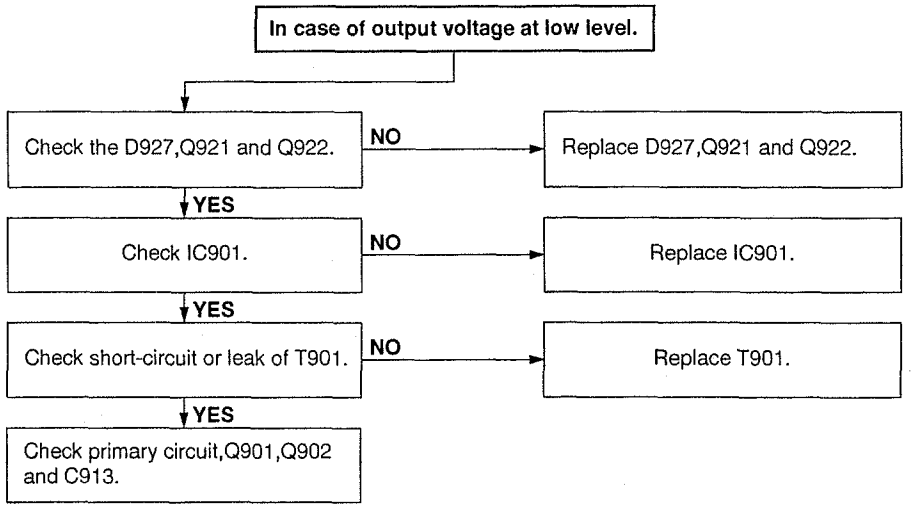
FLOW CHART NO.2 POWER TROUBLESHOOTING (2)


In case of Fuse (F901) blown out.
Replace F901,Q901 and Q902, check D901 as a result of check, if poor, replace at the same time.
Check short-circuit or leak of D921 thru to D925 and secondary circuit.

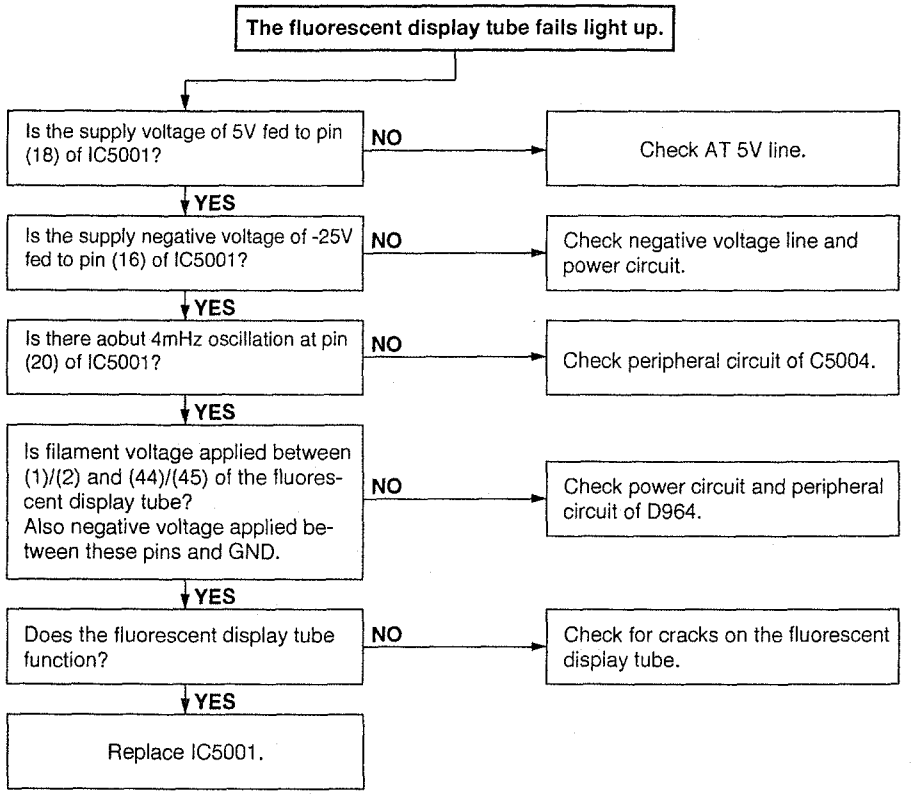
FLOW CHART NO.3 POWER TROUBLESHOOTING (3)



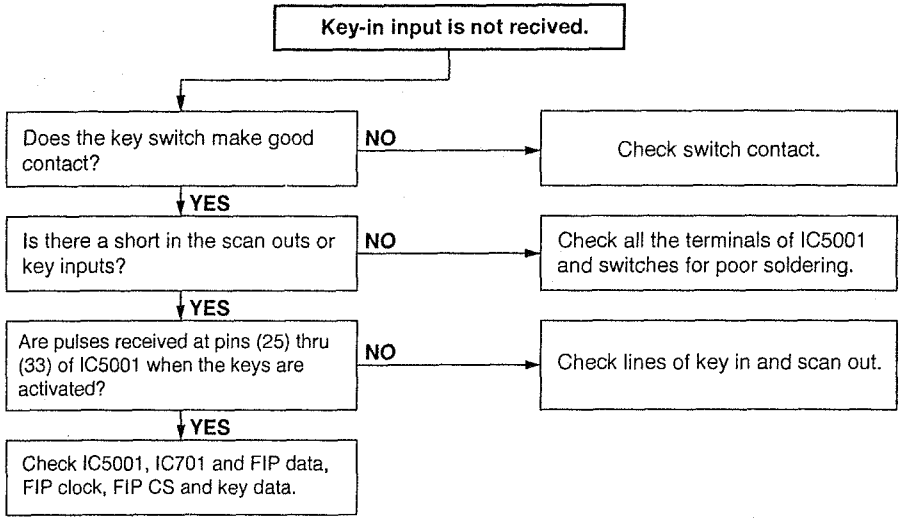
FLOW CHART NO.4 POWER TROUBLESHOOTING (4)



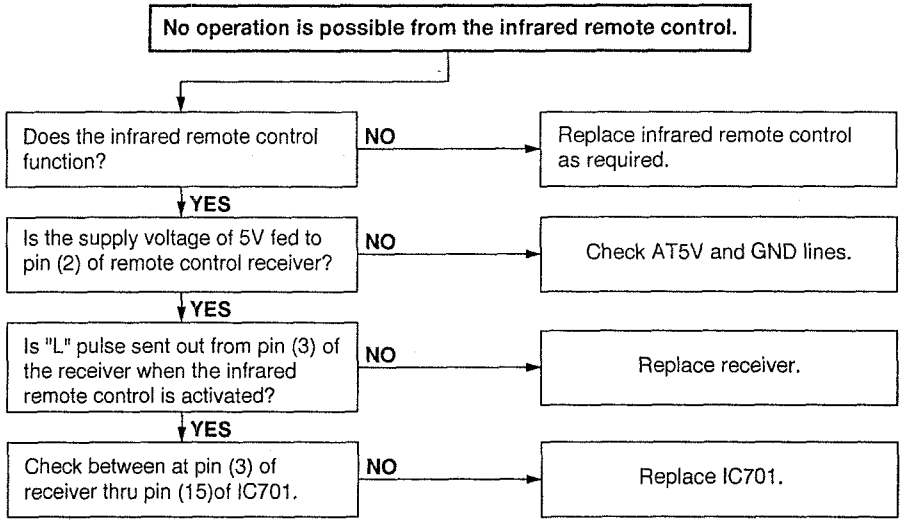
FLOW CHART NO.5 TIMER (1) TROUBLESHOOTING


The fluorescent display tube fails light up.
Is the supply voltage of 5V fed to pin (18) of IC5001?
NO
Check AT 5V line.
YES
Is the supply negative voltage of -25V fed to pin (16) of IC5001?
NO
Check negative voltage line and power circuit.
YES
Is there aobut 4mHz oscillation at pin (20) of IC5001?
NO
Check peripheral circuit of C5004.
YES
Is filament voltage applied between (1)/(2) and (44)/(45) of the fluorescent display tube?
Also negative voltage applied between these pins and GND.
NO
Check power circuit and peripheral circuit of D964.
YES
Does the fluorescent display tube function?
NO
Check for cracks on the fluorescent display tube.
YES
Replace IC5001.

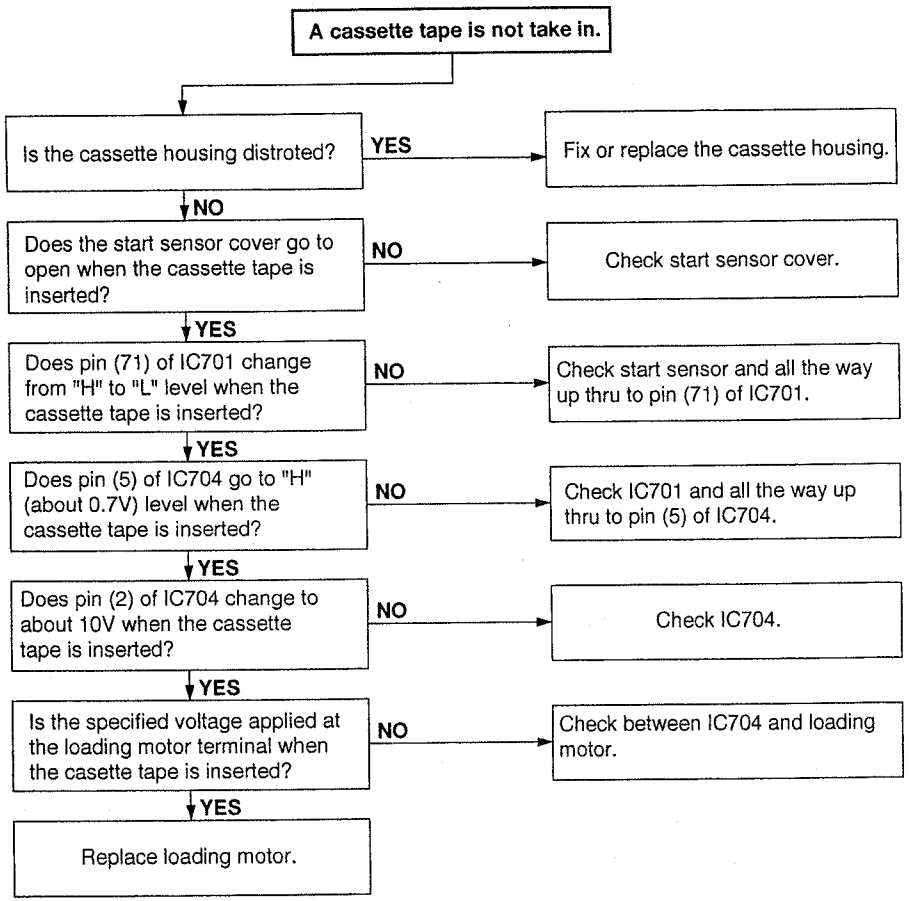
FLOW CHART NO.6 TIMER (2) TROUBLESHOOTING


Key-in input is not recived.
Does the key switch make good contact?
NO
Check switch contact.
YES
Is there a short in the scan outs or key inputs?
NO
Check all the terminals of IC5001 and switches for poor soldering.
YES
Are pulses received at pins (25) thru (33) of IC5001 when the keys are activated?
NO
Check lines of key in and scan out.
YES
Check IC5001, IC701 and FIP data, FIP clock, FIP CS and key data.

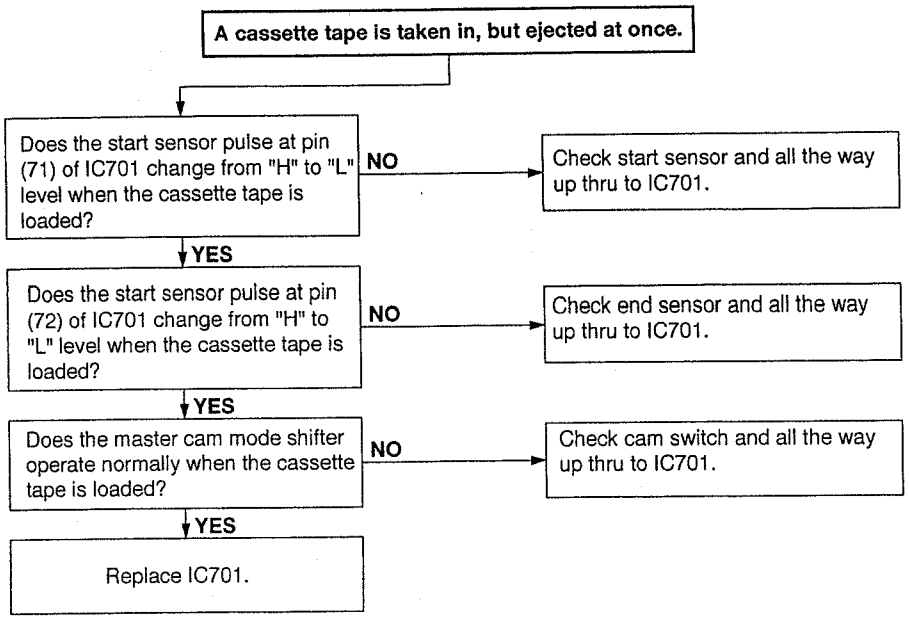
FLOW CHART NO.7 INFRARED R/C TROUBLESHOOTING


No operation is possible from the infrared remote control.
Does the infrared remote control function?
NO
Replace infrared remote control as required.
YES
Is the supply voltage of 5V fed to pin (2) of remote control receiver?
NO
Check AT5V and GND lines.
YES
Is "L" pulse sent out from pin (3) of the receiver when the infrared remote control is activated?
NO
Replace receiver.
YES
Check between at pin (3) of receiver thru pin (15)of IC701.
NO
Replace IC701.

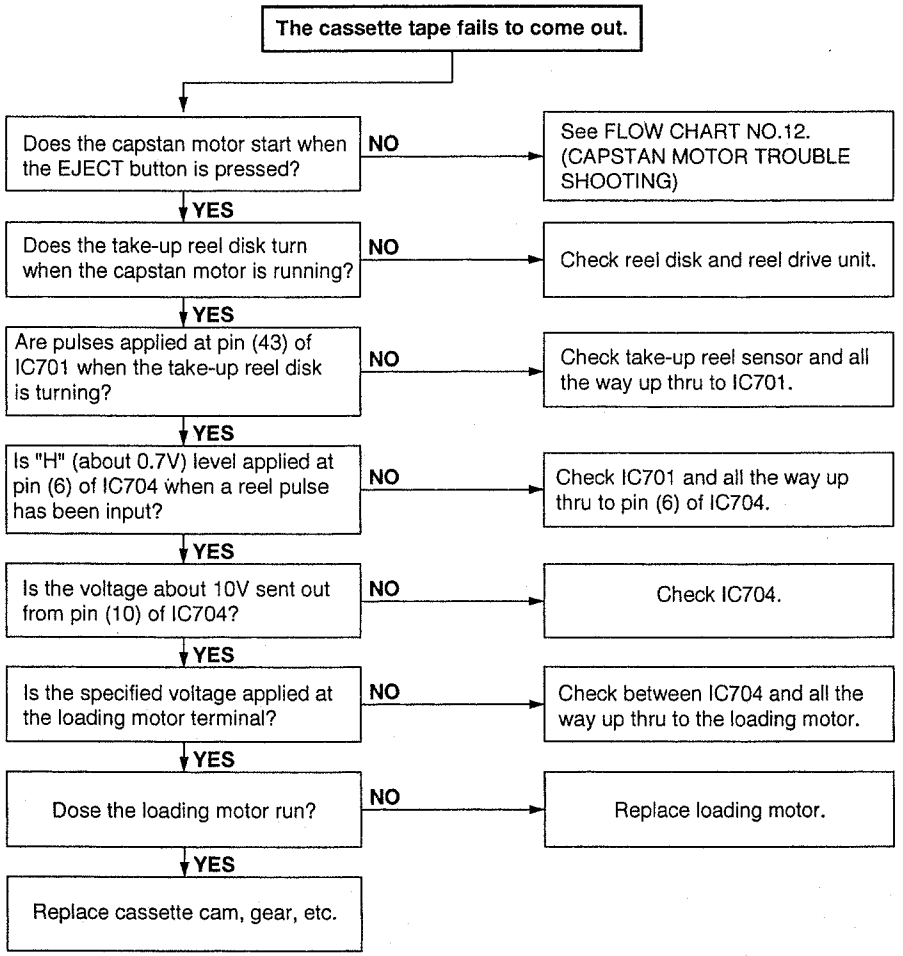
FLOW CHART NO.8 CASSETTE CONTROL TROUBLESHOOTING(1)


A cassette tape is not take in.
Is the cassette housing distroted?
YES
Fix or replace the cassette housing.
NO
Does the start sensor cover go to open when the cassette tape is inserted?
NO
Check start sensor cover.
YES
Does pin (71) of IC701 change from "H" to "L" level when the cassette tape is inserted?
NO
Check start sensor and all the way up thru to pin (71) of IC701.
YES
Does pin (5) of IC704 go to "H" (about 0.7V) level when the cassette tape is inserted?
NO
Check IC701 and all the way up thru to pin (5) of IC704.
YES
Does pin (2) of IC704 change to about 10V when the cassette tape is inserted?
NO
Check IC704.
YES
Is the specified voltage applied at the loading motor terminal when the casette tape is inserted?
NO
Check between IC704 and loading motor.
YES
Replace loading motor.

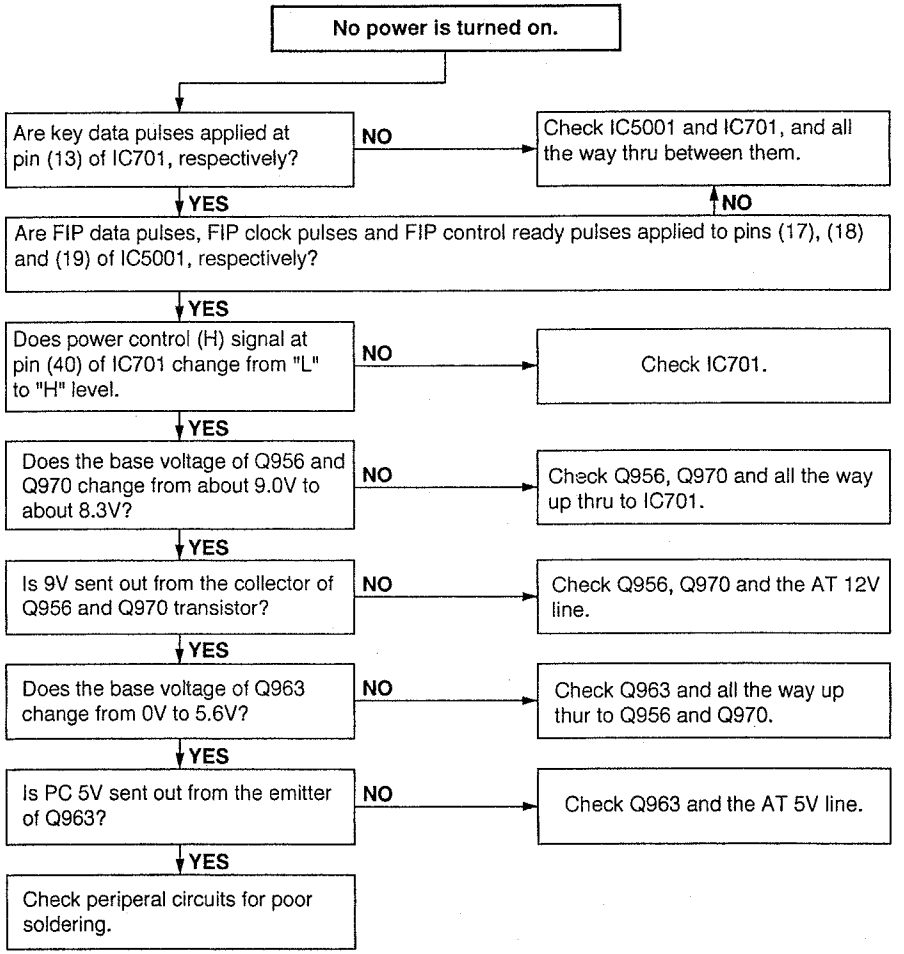
FLOW CHART NO.9 CASSETTE CONTROL TROUBLESHOOTING (2)


A cassette tape is taken in, but ejected at once.
Does the start sensor pulse at pin (71) of IC701 change from "H" to "L" level when the cassette tape is loaded?
NO
Check start sensor and all the way up thru to IC701.
YES
Does the start sensor pulse at pin (72) of IC701 change from "H" to "L" level when the cassette tape is loaded?
NO
Check end sensor and all the way up thru to IC701.
YES
Does the master cam mode shifter operate normally when the cassette tape is loaded?
NO
Check cam switch and all the way up thru to IC701.
YES
Replace IC701.

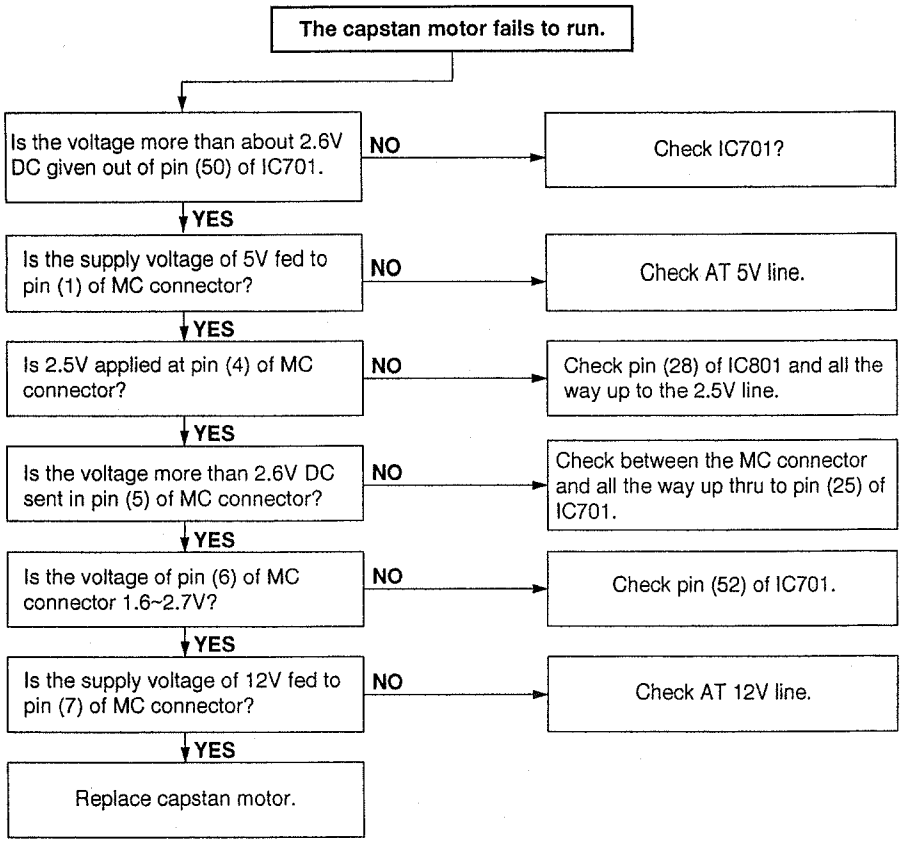
FLOW CHART NO.10 LOADING MOTOR AND EJECT TROUBLESHOOTING


The cassette tape fails to come out.
Does the capstan motor start when the EJECT button is pressed?
NO
See FLOW CHART NO.12. (CAPSTAN MOTOR TROUBLE SHOOTING)
YES
Does the take-up reel disk turn when the capstan motor is running?
NO
Check reel disk and reel drive unit.
YES
Are pulses applied at pin (43) of IC701 when the take-up reel disk is turning?
NO
Check take-up reel sensor and all the way up thru to IC701.
YES
Is "H" (about 0.7V) level applied at pin (6) of IC704 when a reel pulse has been input?
NO
Check IC701 and all the way up thru to pin (6) of IC704.
YES
Is the voltage about 10V sent out from pin (10) of IC704?
NO
Check IC704.
YES
Is the specified voltage applied at the loading motor terminal?
NO
Check between IC704 and all the way up thru to the loading motor.
YES
Dose the loading motor run?
NO
Replace loading motor.
YES
Replace cassette cam, gear, etc.

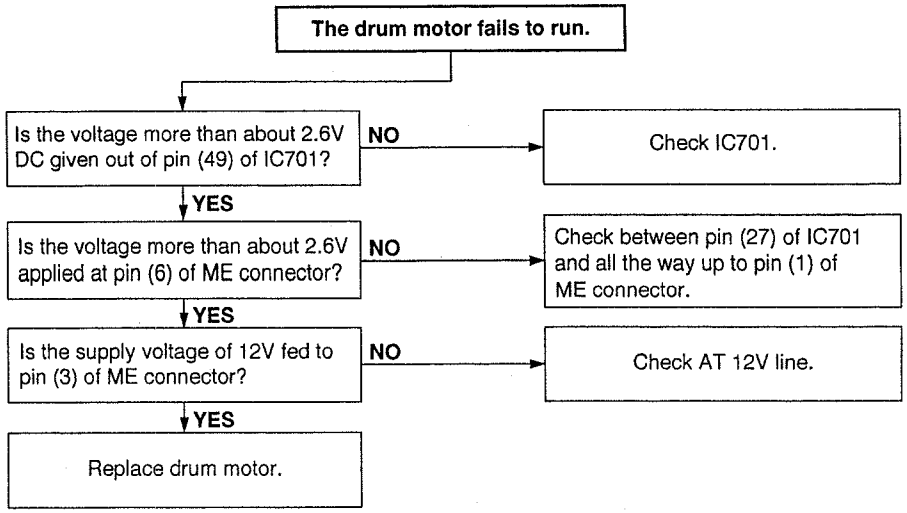
FLOW CHART NO.11 SYSTEM CONTROL TROUBLESHOOTING


No power is turned on.
Are key data pulses applied at pin (13) of IC701, respectively?
NO
Check IC5001 and IC701, and all the way thru between them.
YES
NO
Are FIP data pulses, FIP clock pulses and FIP control ready pulses applied to pins (17), (18) and (19) of IC5001, respectively?
YES
Does power control (H) signal at pin (40) of IC701 change from "L" to "H" level.
NO
Check IC701.
YES
Does the base voltage of Q956 and Q970 change from about 9.0V to about 8.3V?
NO
Check Q956, Q970 and all the way up thru to IC701.
YES
Is 9V sent out from the collector of Q956 and Q970 transistor?
NO
Check Q956, Q970 and the AT 12V line.
YES
Does the base voltage of Q963 change from 0V to 5.6V?
NO
Check Q963 and all the way up thur to Q956 and Q970.
YES
Is PC 5V sent out from the emitter of Q963?
NO
Check Q963 and the AT 5V line.
YES
Check periperal circuits for poor soldering.

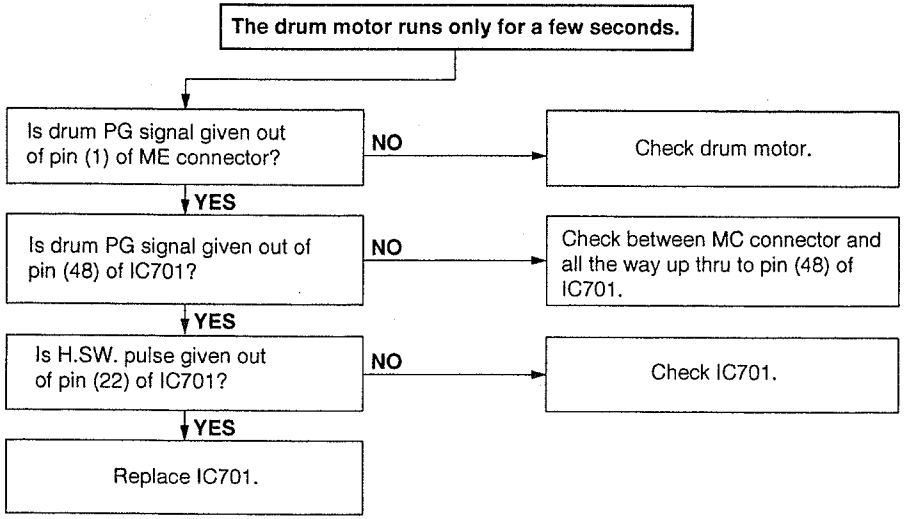
FLOW CHART NO.12 CAPSTAN MOTOR TROUBLESHOOTING


The capstan motor fails to run.
Is the voltage more than about 2.6V DC given out of pin (50) of IC701.
NO
Check IC701?
YES
Is the supply voltage of 5V fed to pin (1) of MC connector?
NO
Check AT 5V line.
YES
Is 2.5V applied at pin (4) of MC connector?
NO
Check pin (28) of IC801 and all the way up to the 2.5V line.
YES
Is the voltage more than 2.6V DC sent in pin (5) of MC connector?
NO
Check between the MC connector and all the way up thru to pin (25) of IC701.
YES
Is the voltage of pin (6) of MC connector 1.6~2.7V?
NO
Check pin (52) of IC701.
YES
Is the supply voltage of 12V fed to pin (7) of MC connector?
NO
Check AT 12V line.
YES
Replace capstan motor.

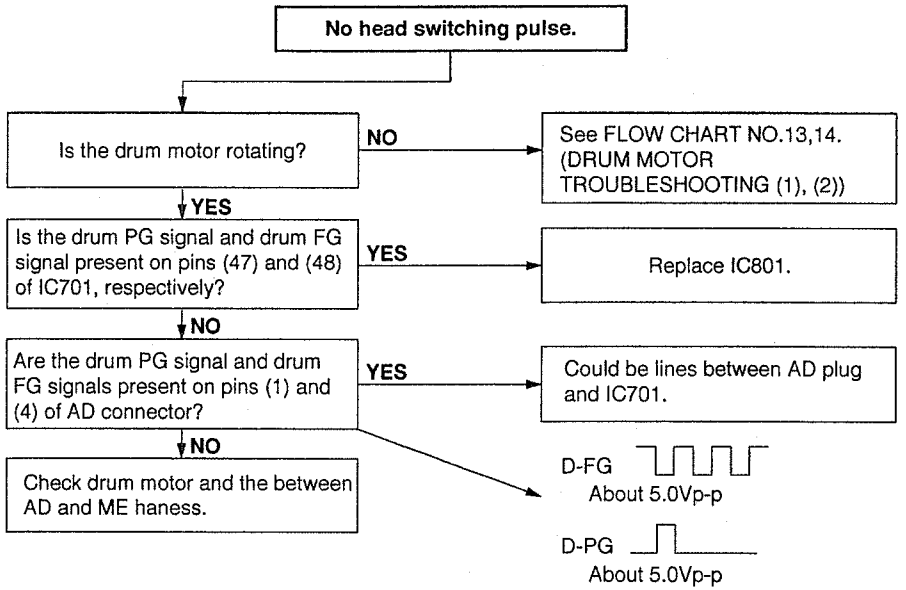
FLOW CHART NO.13 DRUM MOTOR TROUBLESHOOTING (1)


The drum motor fails to run.
Is the voltage more than about 2.6V DC given out of pin (49) of IC701?
NO
Check IC701.
YES
Is the voltage more than about 2.6V applied at pin (6) of ME connector?
NO
Check between pin (27) of IC701 and all the way up to pin (1) of ME connector.
YES
Is the supply voltage of 12V fed to pin (3) of ME connector?
NO
Check AT 12V line.
YES
Replace drum motor.

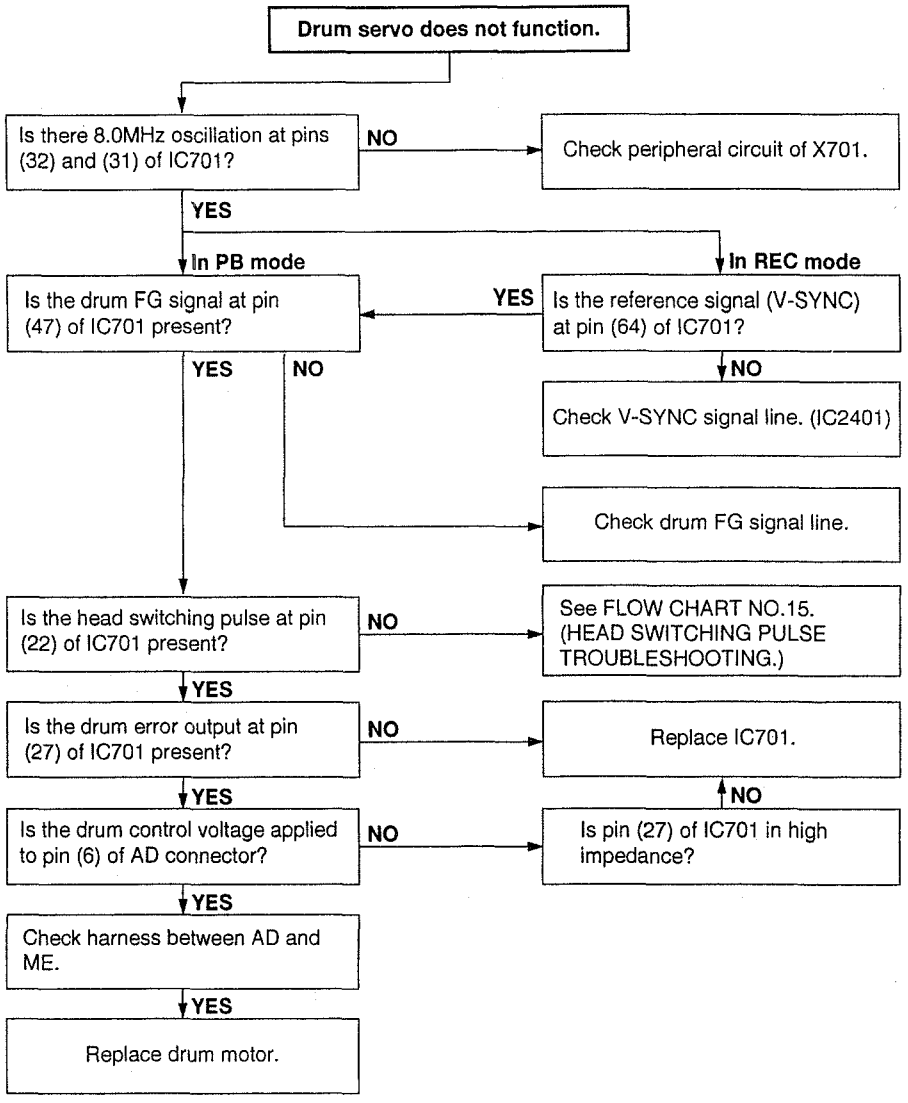
FLOW CHART NO.14 DRUM MOTOR TROUBLESHOOTING (2)


The drum motor runs only for a few seconds.
Is drum PG signal given out of pin (1) of ME connector?
NO
Check drum motor.
YES
Is drum PG signal given out of pin (48) of IC701?
NO
Check between MC connector and all the way up thru to pin (48) of IC701.
YES
Is H.SW. pulse given out of pin (22) of IC701?
NO
Check IC701.
YES
Replace IC701.

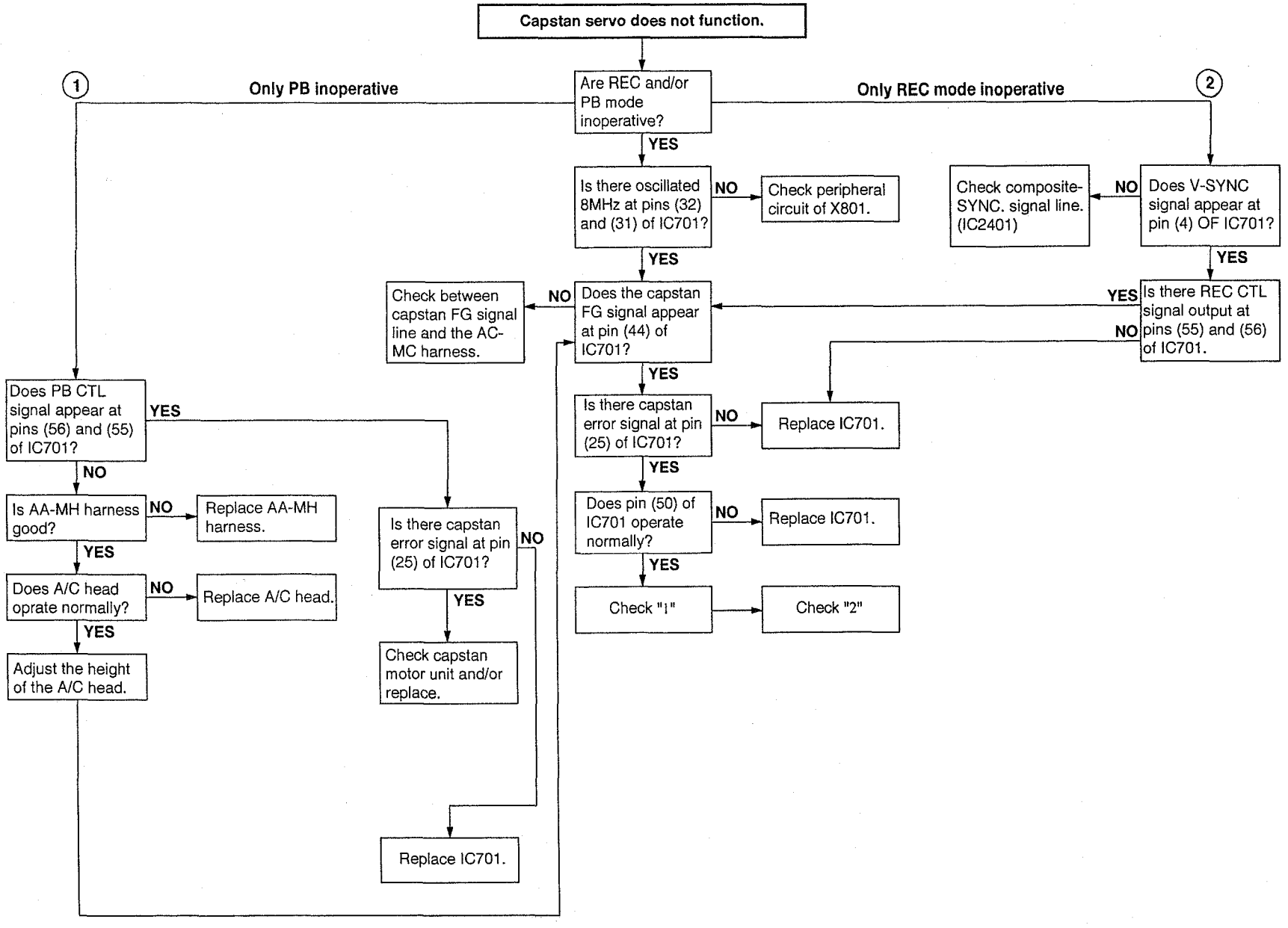
FLOW CHART NO.15 HEAD SWITCHING PULSE TROUBLESHOOTING.


No head switching pulse.
Is the drum motor rotating?
NO
See FLOW CHART NO.13,14. (DRUM MOTOR TROUBLESHOOTING (1), (2))
YES
Is the drum PG signal and drum FG signal present on pins (47) and (48) of IC701, respectively?
YES
Replace IC801.
NO
Are the drum PG signal and drum FG signals present on pins (1) and (4) of AD connector?
YES
Could be lines between AD plug and IC701.
NO
Check drum motor and the between AD and ME haness.
D-FG
About 5.0Vp-p
D-PG
About 5.0Vp-p

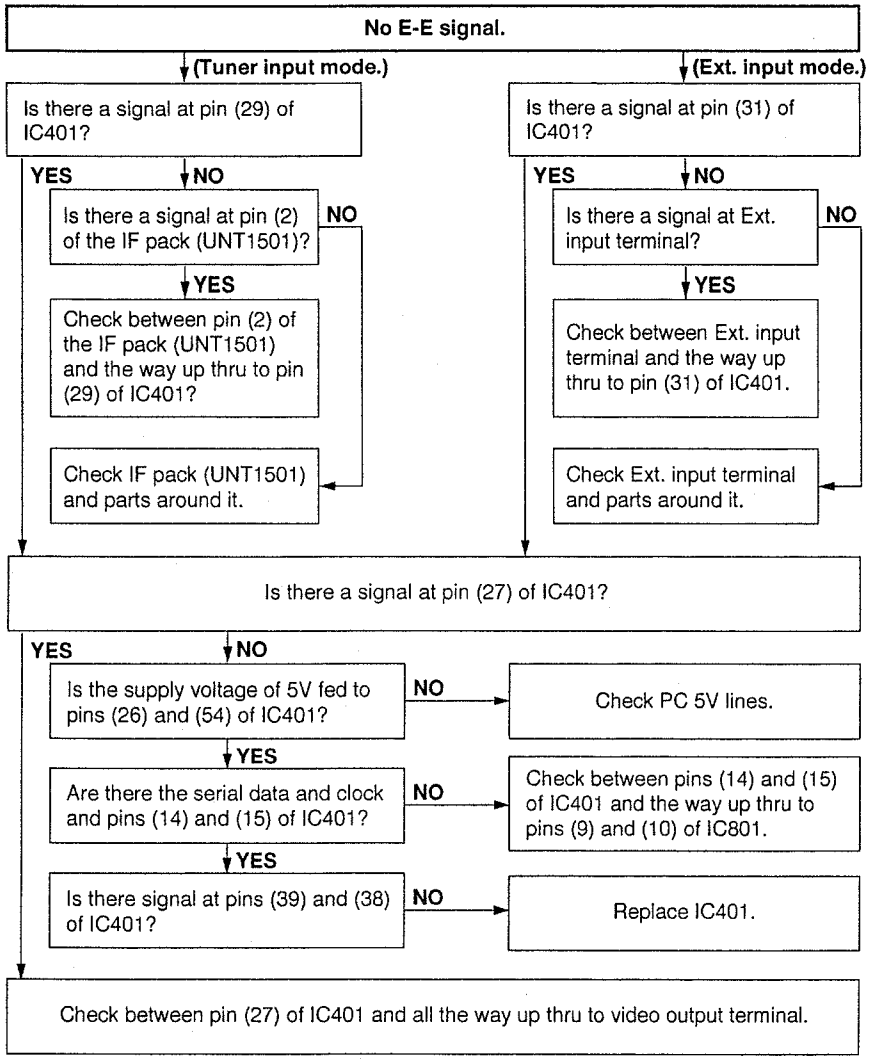
FLOW CHART NO.16 DRUM SERVO TROUBLESHOOTING


Drum servo does not function.
Is there 8.0MHz oscillation at pins (32) and (31) of IC701?
NO
Check peripheral circuit of X701.
YES
In PB mode
In REC mode
Is the drum FG signal at pin (47) of IC701 present?
YES
Is the reference signal (V-SYNC) at pin (64) of IC701?
YES
NO
NO
Check V-SYNC signal line. (IC2401)
Check drum FG signal line.
Is the head switching pulse at pin (22) of IC701 present?
NO
See FLOW CHART NO.15. (HEAD SWITCHING PULSE TROUBLESHOOTING.)
YES
Is the drum error output at pin (27) of IC701 present?
NO
Replace IC701.
YES
NO
Is the drum control voltage applied to pin (6) of AD connector?
NO
Is pin (27) of IC701 in high impedance?
YES
Check harness between AD and ME.
YES
Replace drum motor.

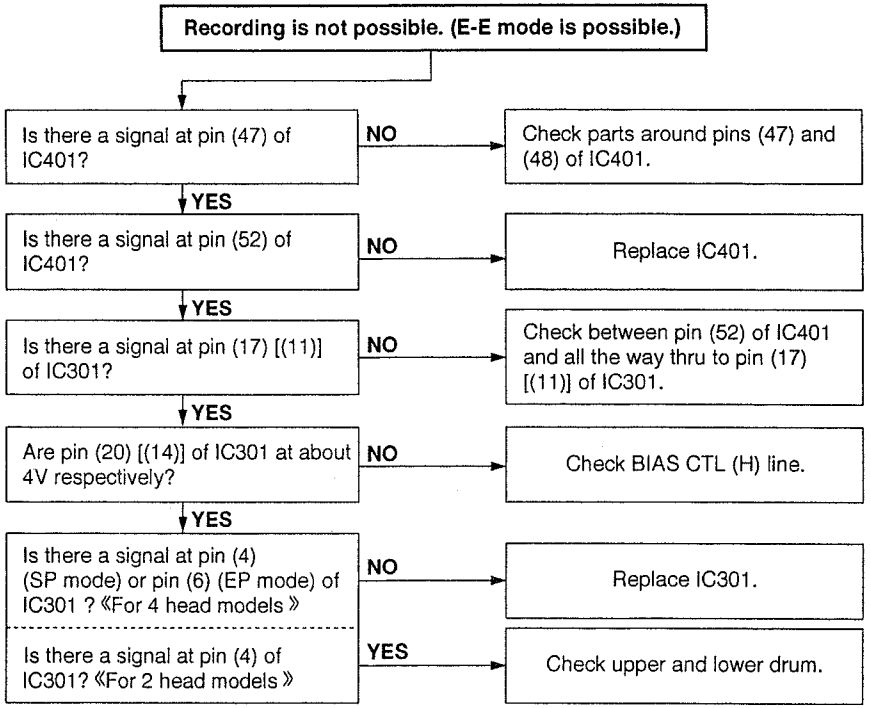
FLOW CHART NO.17 CAPSTAN SERVO TROUBLESHOOTING



FLOW CHART NO.18 E-E MODE TROUBLESHOOTING

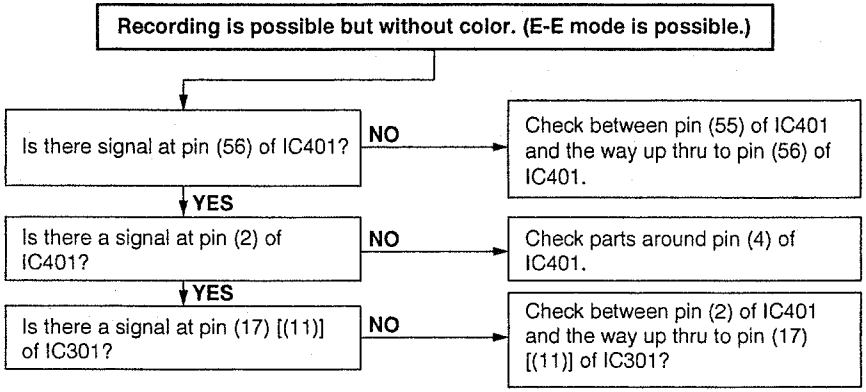

No E-E signal.
(Tuner input mode.)
(Ext. input mode.)
Is there a signal at pin (29) of IC401?
Is there a signal at pin (31) of IC401?
YES
NO
Is there a signal at pin (2) of the IF pack (UNT1501)?
NO
YES
Check between pin (2) of the IF pack (UNT1501) and the way up thru to pin (29) of IC401?
Check IF pack (UNT1501) and parts around it.
Is there a signal at Ext. input terminal?
NO
YES
Check between Ext. input terminal and the way up thru to pin (31) of IC401.
Check Ext. input terminal and parts around it.
Is there a signal at pin (27) of IC401?
YES
NO
Is the supply voltage of 5V fed to pins (26) and (54) of IC401?
NO
Check PC 5V lines.
YES
Are there the serial data and clock and pins (14) and (15) of IC401?
NO
Check between pins (14) and (15) of IC401 and the way up thru to pins (9) and (10) of IC801.
YES
Is there signal at pins (39) and (38) of IC401?
NO
Replace IC401.
Check between pin (27) of IC401 and all the way up thru to video output terminal.

FLOW CHART NO.19 RECORDING MODE (LUMINANCE) TROUBLESHOOTING


Recording is not possible. (E-E mode is possible.)
Is there a signal at pin (47) of IC401?
NO
Check parts around pins (47) and (48) of IC401.
YES
Is there a signal at pin (52) of IC401?
NO
Replace IC401.
YES
Is there a signal at pin (17) [(11)] of IC301?
NO
Check between pin (52) of IC401 and all the way thru to pin (17) [(11)] of IC301.
YES
Are pin (20) [(14)] of IC301 at about 4V respectively?
NO
Check BIAS CTL (H) line.
YES
Is there a signal at pin (4) (SP mode) or pin (6) (EP mode) of IC301 ? 《For 4 head models 》
NO
Replace IC301.
Is there a signal at pin (4) of IC301? 《For 2 head models 》
YES
Check upper and lower drum.

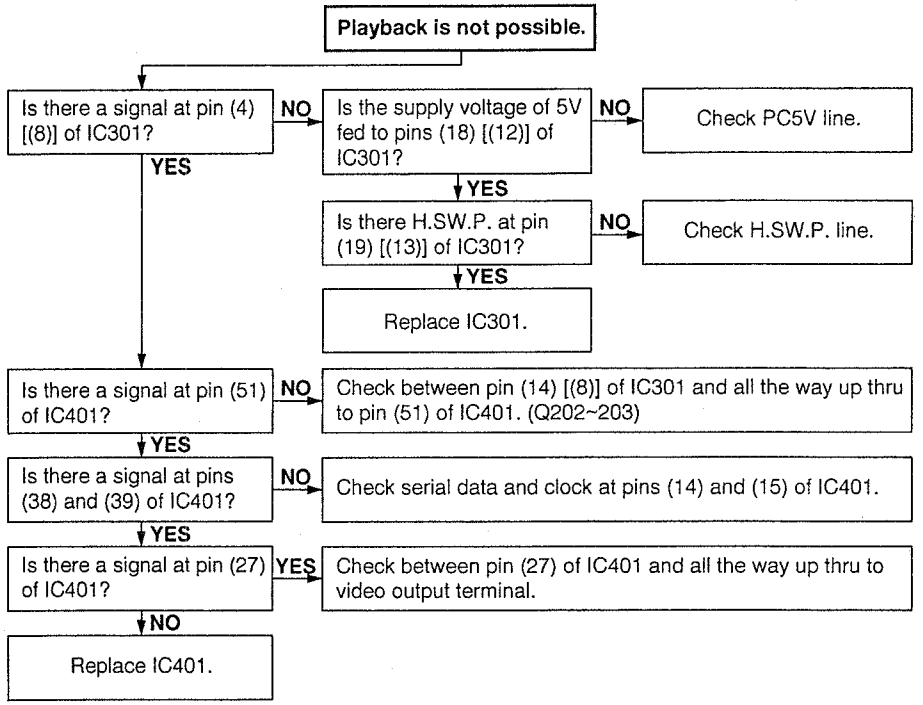
Note: Words shown in the bracket "[ ]" are for the 2 head models only.

FLOW CHART NO.20 RECORDING MODE (CHROMA) TROUBLESHOOTING

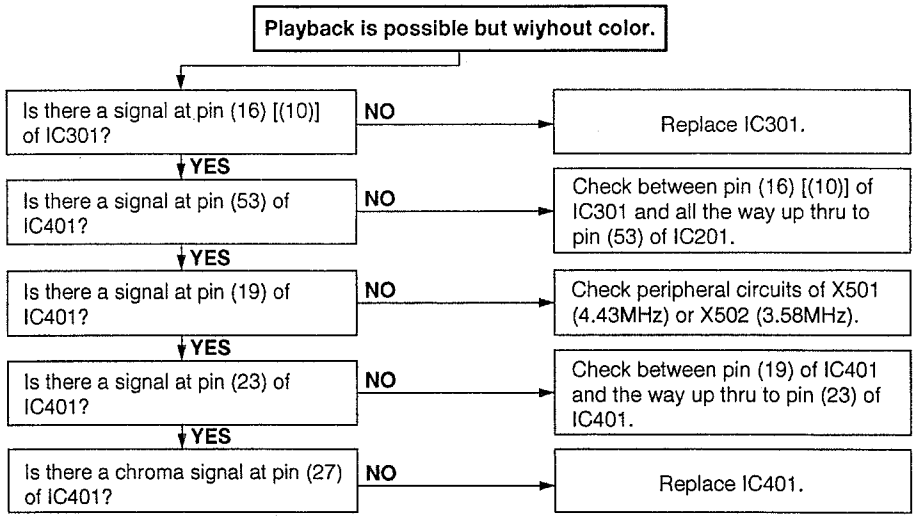

Recording is possible but without color. (E-E mode is possible.)
Is there signal at pin (56) of IC401?
NO
Check between pin (55) of IC401 and the way up thru to pin (56) of IC401.
YES
Is there a signal at pin (2) of IC401?
NO
Check parts around pin (4) of IC401.
YES
Is there a signal at pin (17) [(11)] of IC301?
NO
Check between pin (2) of IC401 and the way up thru to pin (17) [(11)] of IC301?

Note: Words shown in the bracket "[ ]" are for the 2 head models only.

FLOW CHART NO.21 PLAYBACK MODE (LUMINANCE) TROUBLESHOOTING

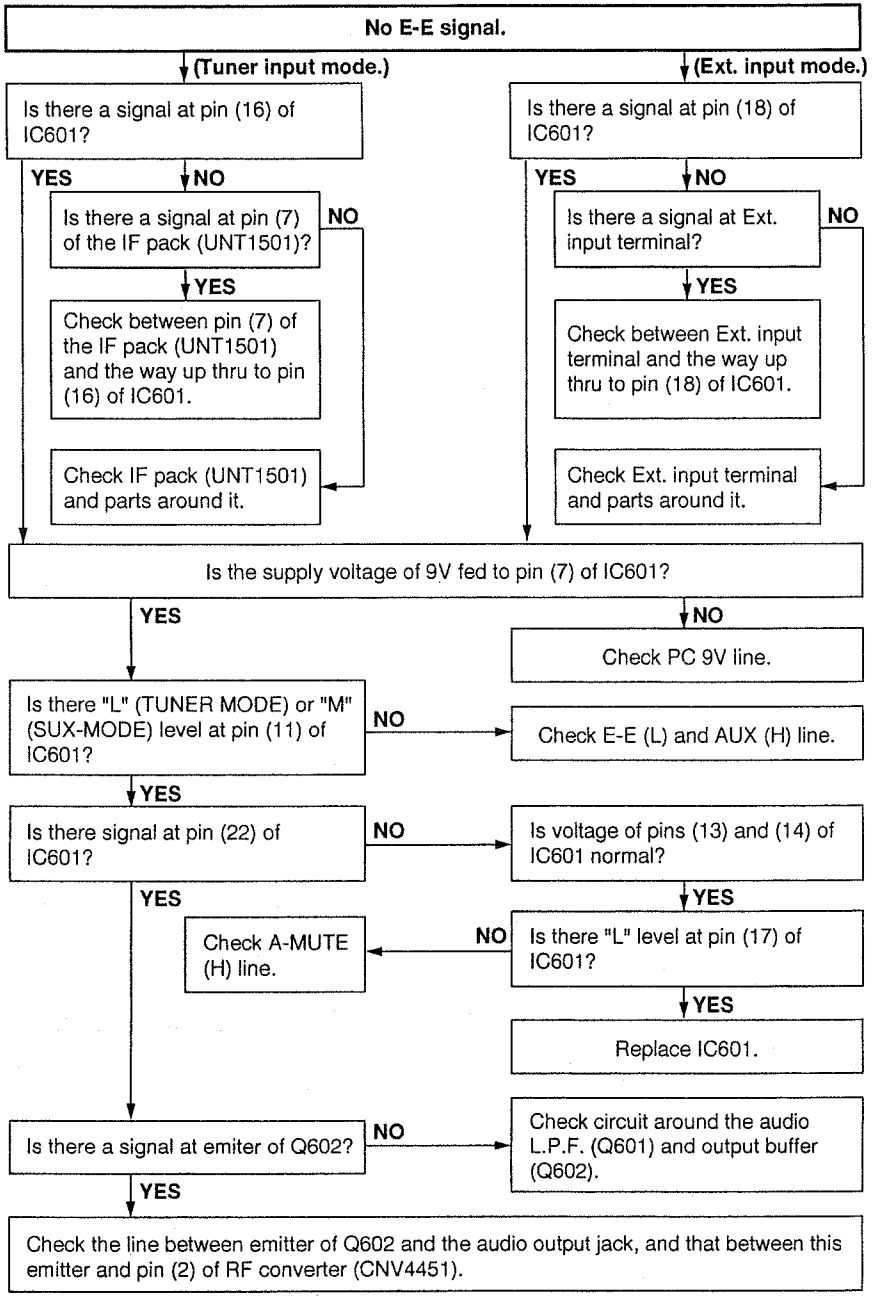

Playback is not possible.
Is there a signal at pin (4) [(8)] of IC301?
NO
Is the supply voltage of 5V fed to pins (18) [(12)] of IC301?
NO
Check PC5V line.
YES
YES
Is there H.SW.P. at pin (19) [(13)] of IC301?
NO
Check H.SW.P. line.
YES
Replace IC301.
Is there a signal at pin (51) of IC401?
NO
Check between pin (14) [(8)] of IC301 and all the way up thru to pin (51) of IC401. (Q202~203)
YES
Is there a signal at pins (38) and (39) of IC401?
NO
Check serial data and clock at pins (14) and (15) of IC401.
YES
Is there a signal at pin (27) of IC401?
YES
Check between pin (27) of IC401 and all the way up thru to video output terminal.
NO
Replace IC401.

FLOW CHART NO.22 PLAYBACK MODE (CHROMA) TROUBLESHOOTING

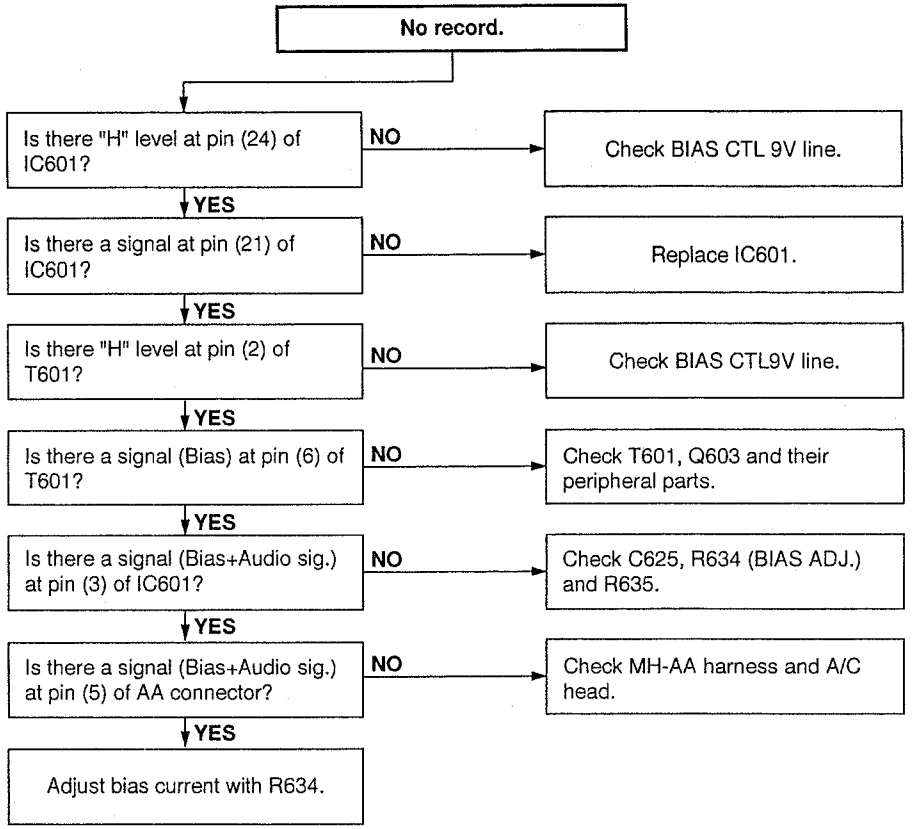

Playback is possible but wiyhout color.
Is there a signal at pin (16) [(10)] of IC301?
NO
Replace IC301.
YES
Is there a signal at pin (53) of IC401?
NO
Check between pin (16) [(10)] of IC301 and all the way up thru to pin (53) of IC201.
YES
Is there a signal at pin (19) of IC401?
NO
Check peripheral circuits of X501 (4.43MHz) or X502 (3.58MHz).
YES
Is there a signal at pin (23) of IC401?
NO
Check between pin (19) of IC401 and the way up thru to pin (23) of IC401.
YES
Is there a chroma signal at pin (27) of IC401?
NO
Replace IC401.

Note: Words shown in the bracket "[ ]" are for the 2 head models only.

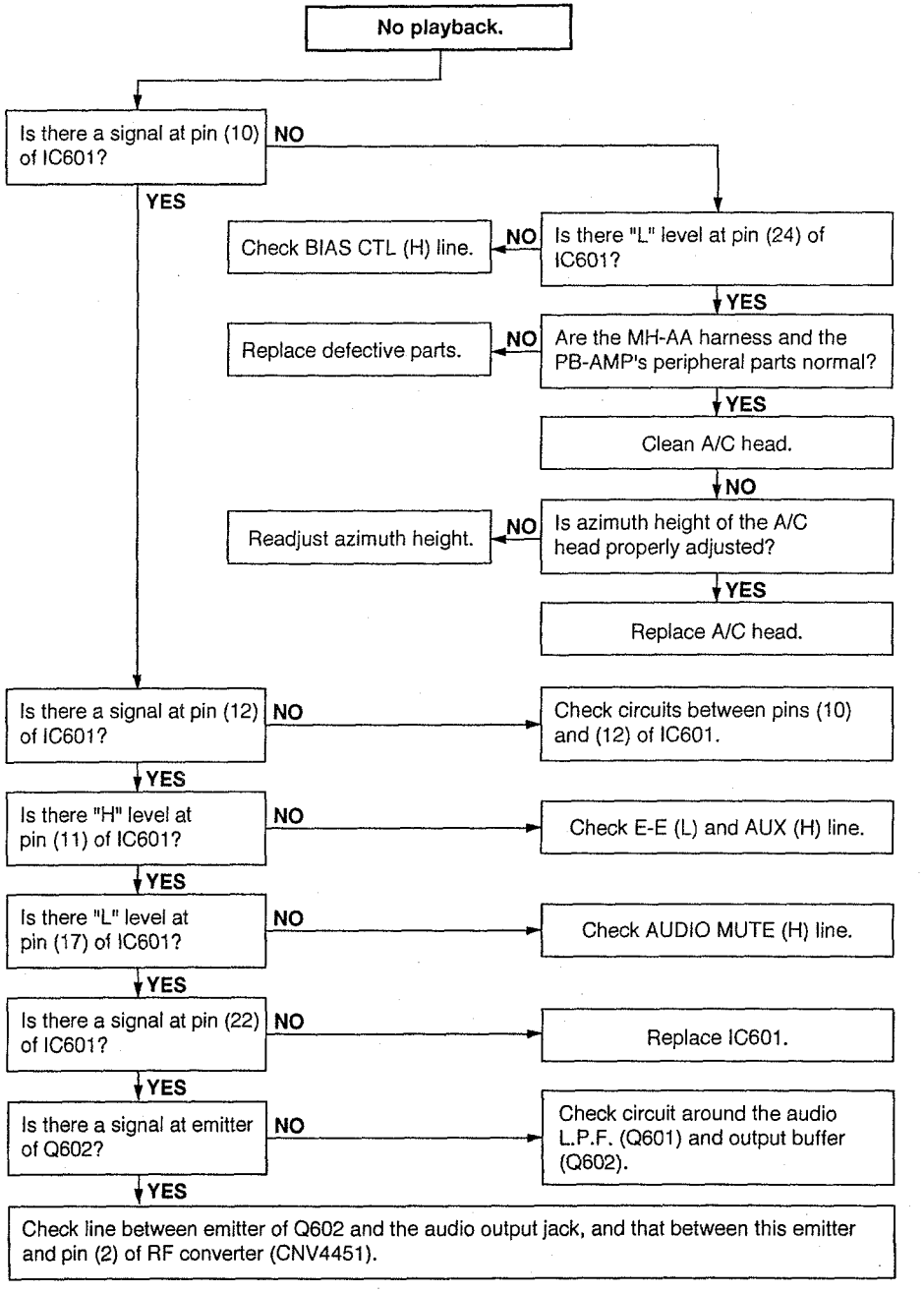
FLOW CHART NO.23 LINEAR SOUND E-E MODE TROUBLESHOOTING


No E-E signal.
(Tuner input mode.)
(Ext. input mode.)
Is there a signal at pin (16) of IC601?
Is there a signal at pin (18) of IC601?
YES
NO
Is there a signal at pin (7) of the IF pack (UNT1501)?
Is there a signal at Ext. input terminal?
Check between pin (7) of the IF pack (UNT1501) and the way up thru to pin (16) of IC601.
Check between Ext. input terminal and the way up thru to pin (18) of IC601.
Check IF pack (UNT1501) and parts around it.
Check Ext. input terminal and parts around it.
Is the supply voltage of 9V fed to pin (7) of IC601?
Check PC 9V line.
Is there "L" (TUNER MODE) or "M" (SUX-MODE) level at pin (11) of IC601?
Check E-E (L) and AUX (H) line.
Is there signal at pin (22) of IC601?
Is voltage of pins (13) and (14) of IC601 normal?
Check A-MUTE (H) line.
Is there "L" level at pin (17) of IC601?
Replace IC601.
Is there a signal at emiter of Q602?
Check circuit around the audio L.P.F. (Q601) and output buffer (Q602).
Check the line between emitter of Q602 and the audio output jack, and that between this emitter and pin (2) of RF converter (CNV4451).

FLOW CHART NO.24 LINEAR SOUND RECORDING MODE TROUBLESHOOTING


No record.
Is there "H" level at pin (24) of IC601?
Check BIAS CTL 9V line.
Is there a signal at pin (21) of IC601?
Replace IC601.
Is there "H" level at pin (2) of T601?
Check BIAS CTL9V line.
Is there a signal (Bias) at pin (6) of T601?
Check T601, Q603 and their peripheral parts.
Is there a signal (Bias+Audio sig.) at pin (3) of IC601?
Check C625, R634 (BIAS ADJ.) and R635.
Is there a signal (Bias+Audio sig.) at pin (5) of AA connector?
Check MH-AA harness and A/C head.
Adjust bias current with R634.

FLOW CHART NO.25 LINEAR SOUND PLAYBACK MODE TROUBLESHOOTING


No playback.
Is there a signal at pin (10) of IC601?
NO
YES
Is there "L" level at pin (24) of IC601?
NO
Check BIAS CTL (H) line.
YES
Are the MH-AA harness and the PB-AMP's peripheral parts normal?
NO
Replace defective parts.
YES
Clean A/C head.
NO
Is azimuth height of the A/C head properly adjusted?
NO
Readjust azimuth height.
YES
Replace A/C head.
Is there a signal at pin (12) of IC601?
NO
Check circuits between pins (10) and (12) of IC601.
YES
Is there "H" level at pin (11) of IC601?
NO
Check E-E (L) and AUX (H) line.
YES
Is there "L" level at pin (17) of IC601?
NO
Check AUDIO MUTE (H) line.
YES
Is there a signal at pin (22) of IC601?
NO
Replace IC601.
YES
Is there a signal at emitter of Q602?
NO
Check circuit around the audio L.P.F. (Q601) and output buffer (Q602).
YES
Check line between emitter of Q602 and the audio output jack, and that between this emitter and pin (2) of RF converter (CNV4451).

REPLACEMENT OF IC703 (E^2PROM)

«Servicing precautions»
When the IC703 (E^2PROM) has been replaced,make the following reprogramming.
Depending on models, the IC703 (E^2PROM) has been factory adjusted for it's memory function.
It's therefore necessary to reprogram the memory function for the model in question.
Note that the servo circuit requires readjustments for the head switching point, slow and still modes. The channels will require returning.

Memory function reprogramming.

1. Check the power off. (power is standby mode)
2. Press the TEST switch S5005.
   Be sure that all the fluorescent display tubes light up into the TEST mode.
3. Using the CHANNEL (+) and (–) buttons, select the right function numbers from among JP0-JP31,which appear in the fluorescent display tube, referring to the E^2PROM map.
   Press the OSD button to pick up the functions (ON) and the CLEAR button to discard the functions (OFF).
   OSD and CLEAR buttons, are located on the remote control unit.
   * When the OSD button has been pressed (ON), the memory function No. starts flashing.
   * When the CLEAR button has been pressed (OFF), the memory function No. lights up.
4. Press the INT switch S5004.
5. Example: "ON" and "OFF" are taken as "1" and "0" respectively.
   The numbers JP0 to JP31 are divided into four groups and each group's setting is displayed in hexadecimal notation.

J31	J30	J29	J28	J27	J26	J25	J24	J23	J22	J21	J20	J19	J18	J17	J16
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		⇩				⇩				⇩				⇩	
		SPACE				0				0				0	

J15	J14	J13	J12	J11	J10	J09	J08	J07	J06	J05	J04	J03	J02	J01	J00
0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	1
		⇩				⇩				⇩				⇩	
		0				4				0				D	

"000040D" appears in the fluorescent display tube.

6. Finally press the TEST key S5005.

NOTE: The remote control from VCR 3706 series must be used to reprogram the E^2PROM, due to the CLEAR button not being present on another remote control.

(OSD = [+])

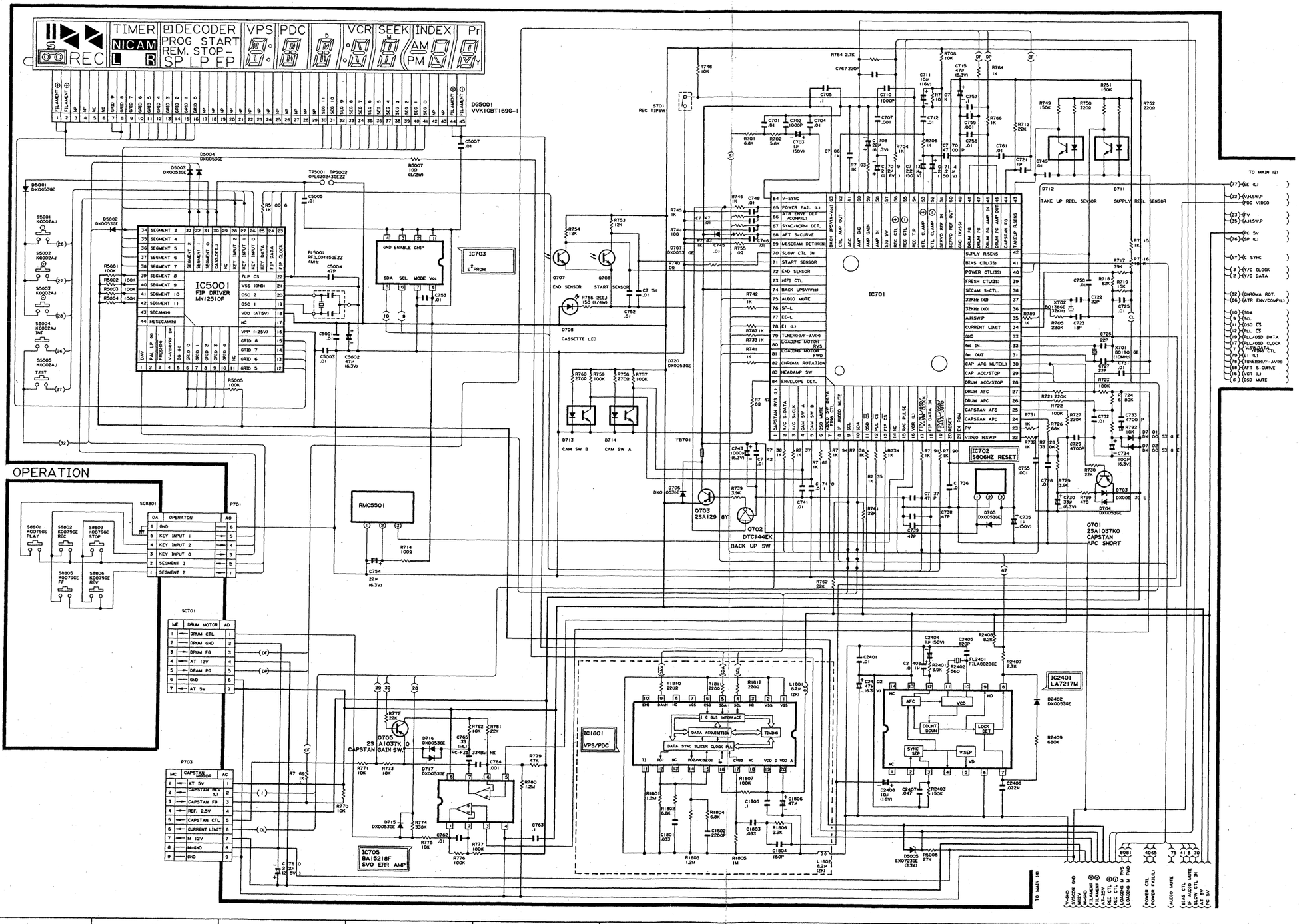
ROM MAP

	3706NE	3706CE	3706SE	3716NE	3716CE	3716I	3716EP	3716UK	4706NE	7156NE
JP31 —	0	0	0	0	0	0	0	0	0	0
30 —	0	0	0	0	0	0	0	0	0	0
29 —	0	0	0	0	0	0	0	0	0	0
28 —	0	0	0	0	0	0	0	0	0	0
27 VS ENVE	0	0	0	0	0	0	0	0	0	0
26 —	0	0	0	0	0	0	0	0	0	0
25 HEAD 1	0	0	0	0	0	0	0	0	0	0
24 HEAD 0	0	0	0	0	0	0	0	1	0	0
23 Hi-Fi	0	0	0	0	0	0	0	0	0	0
22 AUTO CLOCK	0	0	0	1	1	1	1	1	0	0
AUTO SORTING	0	0	0	1	1	1	1	1	0	0
21 DECODER	0	0	0	0	0	0	1	0	0	0
20 SHUTTLE	0	0	0	0	0	0	0	0	0	0
19 NICAM 1	0	0	0	0	0	0	0	0	0	0
18 NICAM 0	0	0	0	0	0	0	0	0	0	0
17 G-CODE 1	0	0	0	0	0	0	0	0	0	0
16 G-CODE 0	0	0	0	1	1	1	1	1	0	0
15 OEM	0	0	0	0	0	0	0	0	1	1
14 LP	0	0	0	0	0	0	0	1	0	0
13 FRONT-AV	0	0	0	0	0	0	0	0	0	0
12 DUAL SCART	0	0	0	0	0	0	1	0	0	0
11 CATV/PIF	1	1	1	1	1	1	1	0	1	1
10 TUNER 2	0	0	0	0	0	0	0	0	0	0
9 TUNER 1	0	0	0	0	0	0	0	1	0	0
8 TUNER 0	0	0	0	0	0	0	0	1	0	0
7 REMAIN	1	1	1	1	1	1	1	1	1	1
6 DK/BG	0	0	0	0	0	0	0	0	0	0
5 VCR 1	1	1	1	1	1	1	1	1	1	1
4 VCR 0	0	0	0	0	0	0	0	0	0	0
3 PDC	0	1	0	1	1	0	0	1	1	1
2 VPS	0	1	0	1	1	0	0	1	1	1
1 COLOR 1	0	0	0	0	0	0	0	0	0	0
0 COLOR 0	0	0	0	0	0	0	0	0	0	0
DISPLAY	8A0	8AC	8A0	4108AC	4108AC	4108A0	6118A0	14143AC	88AC	88AC

(Note: "1" : flashing "0" : lights up)

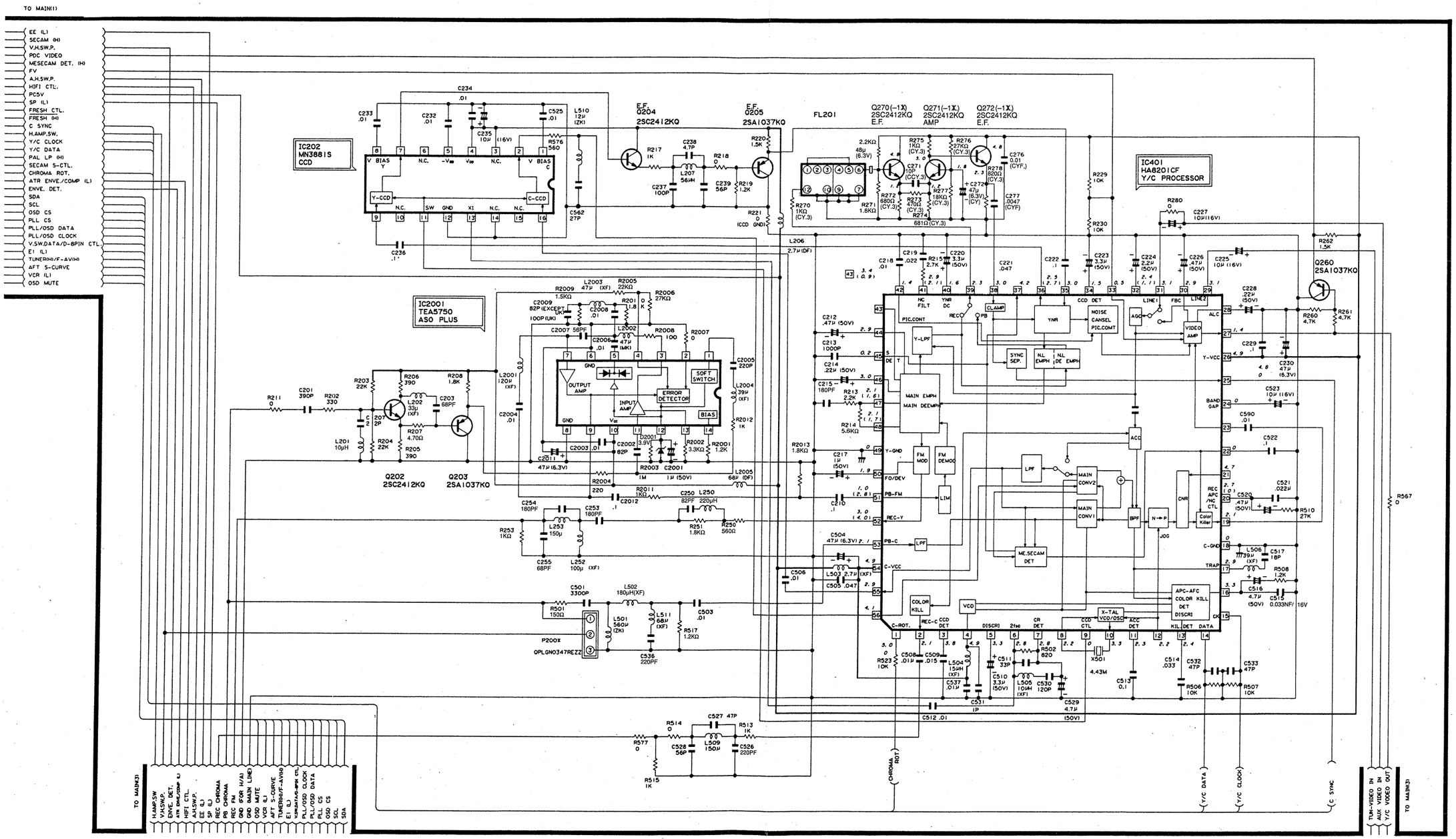
NOTES:

MAIN(1) CIRCUIT (VCR3706NE/CE/SE/4706NE/7156NE/3716NE/CE/I/EP/UK)



* VOLTAGE MEASUREMENT MODE
PB..... Parentheses ( )
REC ..... Without Parentheses

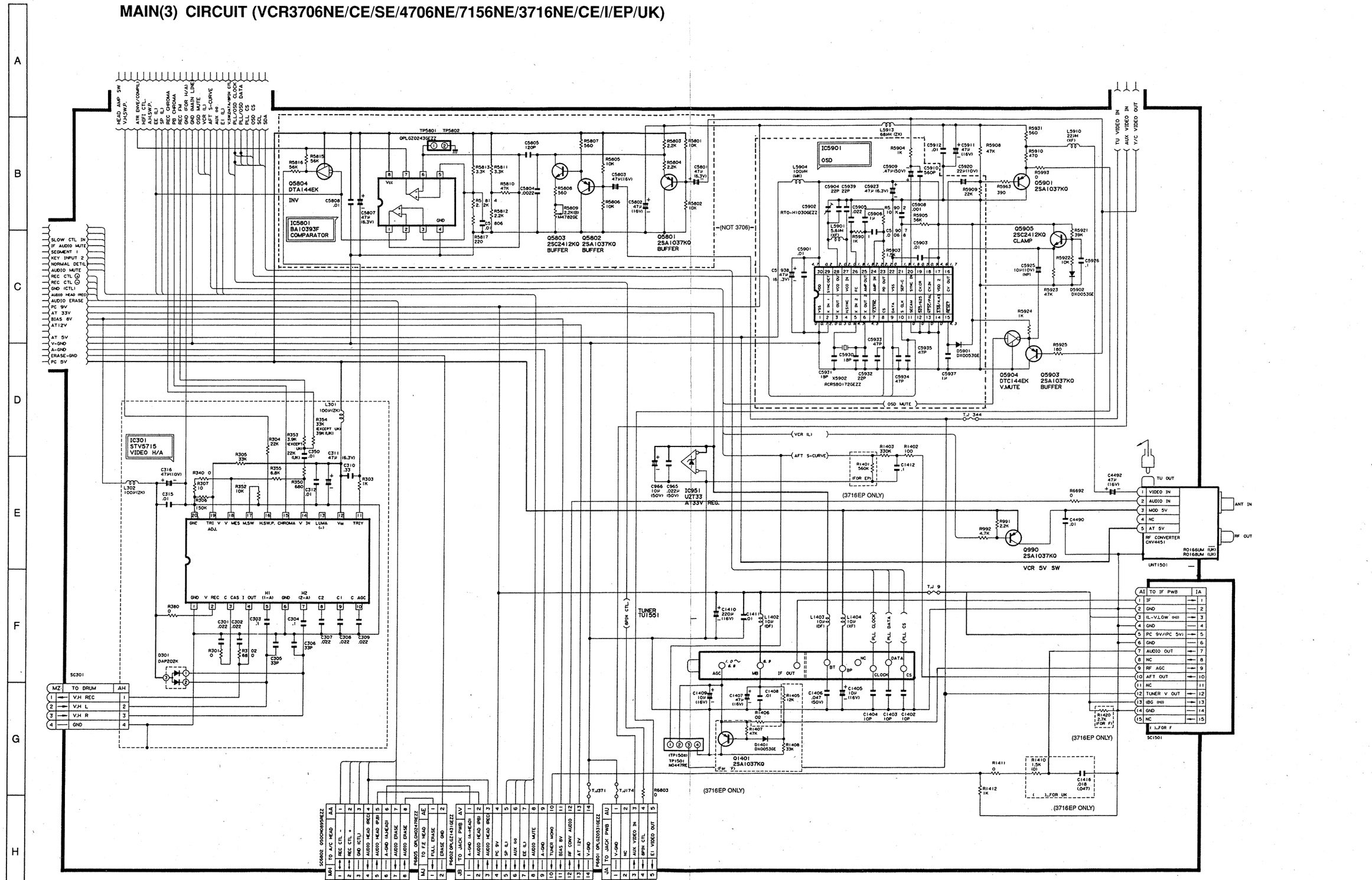
MAIN(2) CIRCUIT (VCR3706NE/CE/SE/4706NE/7156NE/3716NE/CE/I/EP/UK)



1	2	3	4	5	6	7	8	9	10	11	12

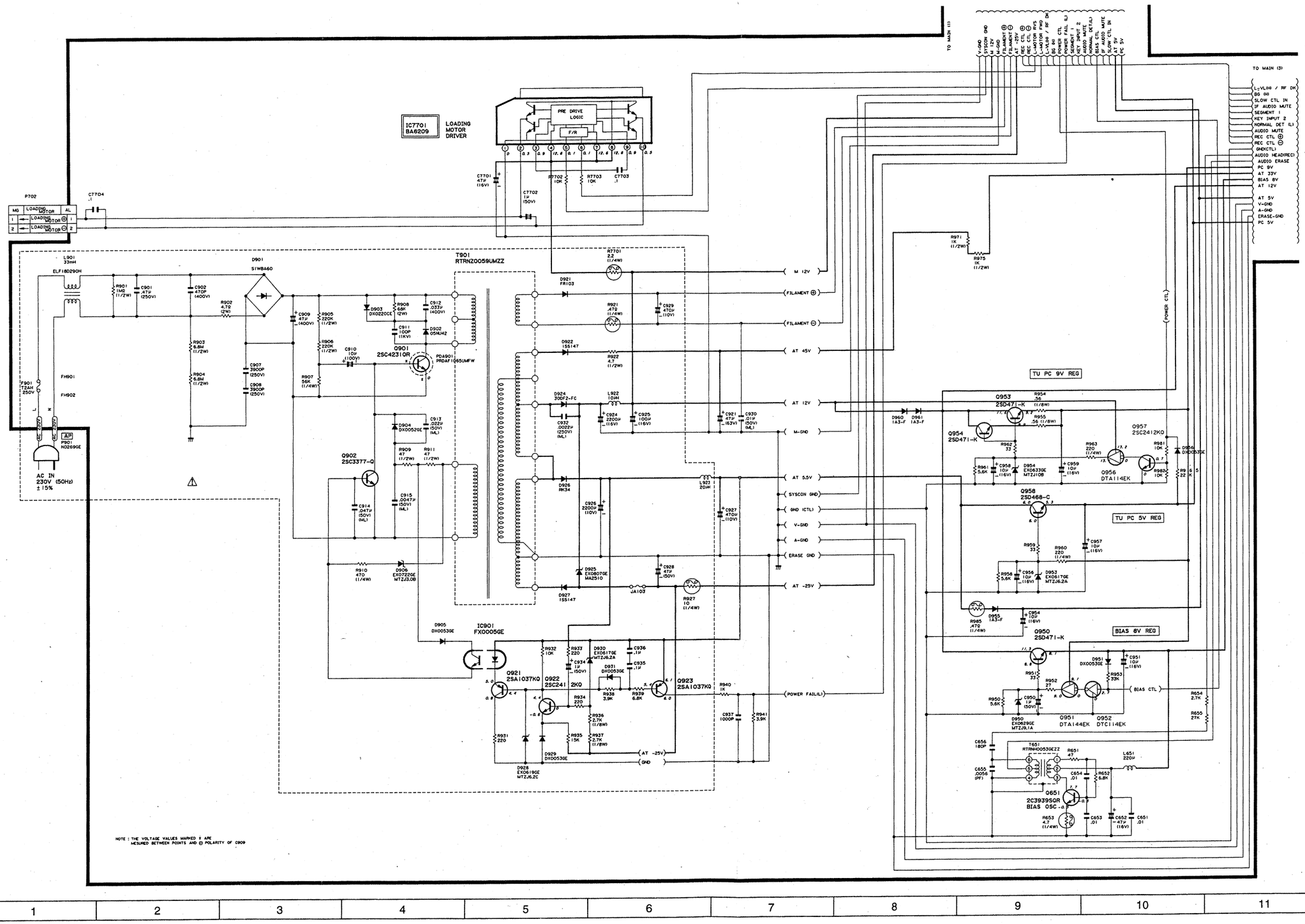
* VOLTAGE MEASUREMENT MODE
PB..... Parentheses ( )
REC ..... Without Parentheses

MAIN(3) CIRCUIT (VCR3706NE/CE/SE/4706NE/7156NE/3716NE/CE/I/EP/UK)



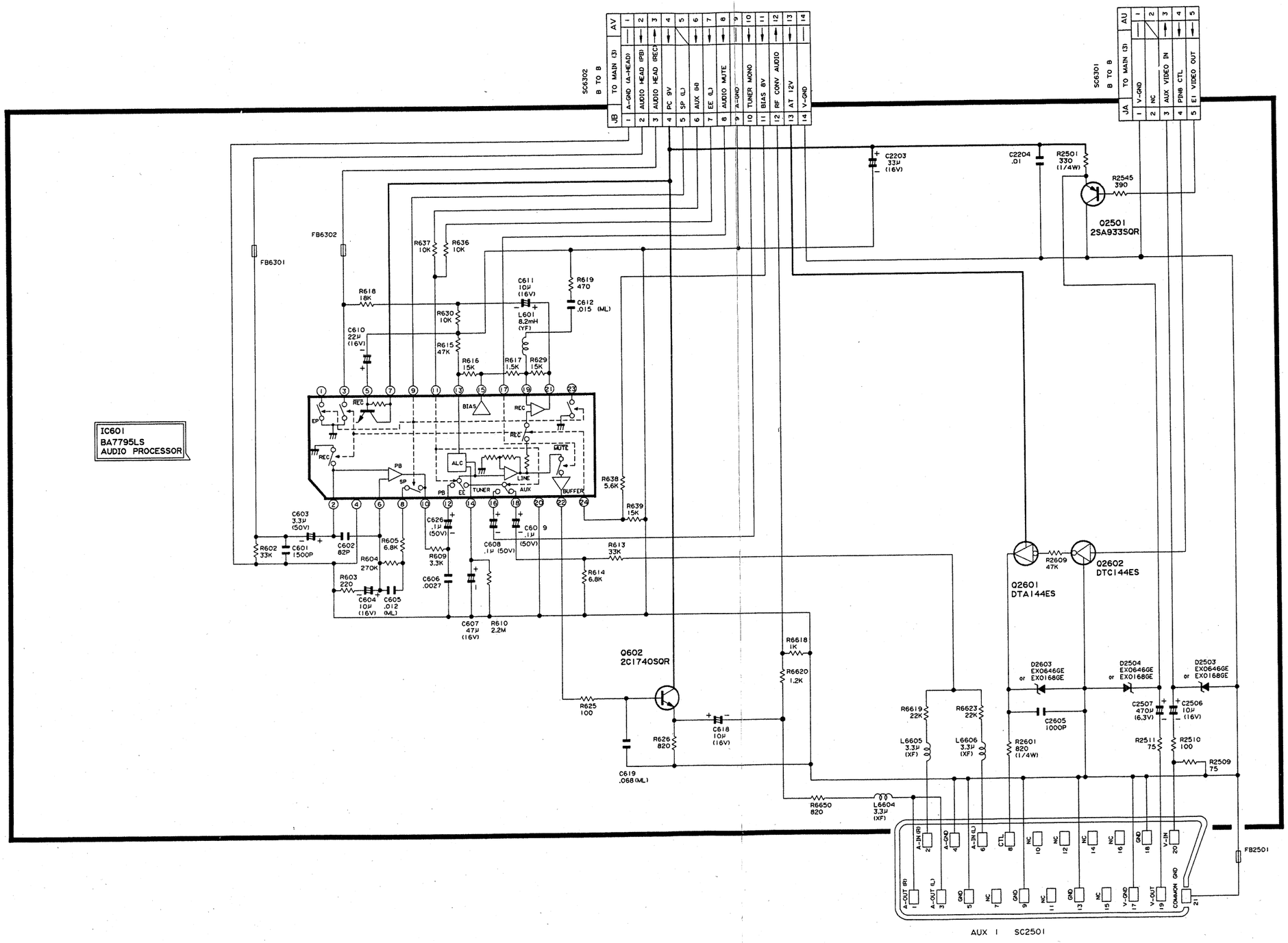
* VOLTAGE MEASUREMENT MODE
PB..... Parentheses ( )
REC ..... Without Parentheses

MAIN(4) CIRCUIT (VCR3706NE/CE/SE/4706NE/7156NE/3716NE/CE/I/EP/UK)



* VOLTAGE MEASUREMENT MODE
PB..... Parentheses ( )
REC ..... Without Parentheses

TERMINAL CIRCUIT (VCR3706NE/CE/SE/4706NE/7156NE/3716NE/CE/I/EP/UK)



* VOLTAGE MEASUREMENT MODE
PB..... Parentheses ( )
REC ..... Without Parentheses

NOTES:

10. REPLACEMENT PARTS LIST
PARTS REPLACEMENT

Many electrical and mechanical parts in video cassette recorder have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual; electrical components having such features are identified by ⚠ and shaded areas in the Replacement Parts Lists and Schematic Diagrams. The use of a substitute replacement part which does not have the same safety characteristics as the factory recommended replacement parts shown in this service manual may create shock, fire or other hazards.

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

1. **MODEL NUMBER**
2. **REF. NO.**
3. **PART NO.**
4. **DESCRIPTION**

HOW TO IDENTIFY CHIP TRANSISTORS AND DIODES BY ITS MARKING

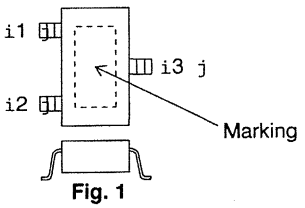


Fig. 1

(1) Base/Input
(2) Emitter/Ground
(3) Collector/Output

Package	Marking	Parts No.
Fig. 1	25	
Fig. 1	24	
Fig. 1	26	
Fig. 1	16	
Fig. 1	BQ	
Fig. 1	FQ	

MARK ♠: SPARE PARTS-DELIVERY SECTION.

Ref. No.	Part No.	Description

PRINTED WIRING BOARD ASSEMBLIES
(NOT REPLACEMENT ITEM)

- Main Unit
- Main Unit
- Main Unit
- Main Unit
- Operation Unit

Ref. No.	Part No.	Description

MAIN UNIT ASSEMBLY

TUNER AND ASSEMBLY

CNV4451	58260563	RF Converter
	58260564	(UK only)
TU1551	58230625	VHF Tuner
	58230624	(UK only)
UNT1501	58260565	IF-PACK Unit
	58260566	(UK only)

INTEGRATED CIRCUITS

IC202	37717029	IC MN3881S1E
IC301	37717038	IC STV5715
IC401	37717028	IC HA8201CF1
IC601	37717003	IC BA 7795LS
IC701	37717032	Syscon/Servo/Timer (VCR3716CE/I)
IC701	37717033	Syscon/Servo/Timer (VCR3716UK)
IC701	37717034	Syscon/Servo/Timer (VCR3706NE/CE/SE 4706NE/7156NE)
IC701	37717035	Syscon/Servo/Timer (VCR3716NE)
IC701	37717036	Syscon/Servo/Timer (VCR3716EP)
IC702	37717007	IC S 806HZ
IC703	37717040	E²PROM (VCR3716NE/CE/EP/I/UK)
IC703	37717039	E²PROM (VCR3706NE/CE/SE/ 4706NE/7156NE)
IC705	37717005	IC BA 15128F
IC951	37717011	IC UZT33
IC1801	37717037	IC SDA5649X (VCR3706NE/CE/SE/3716CE/ UK)
IC2001	37717030	IC TEA5750
IC2401	37716993	IC LA7217M
IC2501	37716997	IC BA 7630F (VCR3716EP)
IC5001	37716998	IC MN 12510F
IC5801	37716183	IC BA 10393F (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
IC5901	37717031	OSD (VCR3716NE/CE/I/EP/UK)
IC6681	37717004	IC BA 7631F (VCR3716EP)
IC7701	37715089	IC BA 6209

TRANSISTORS

Q202	36145507	2SC2412KQ
Q203	36147830	2SA1037KQ
Q204	36145507	2SC2412KQ
Q205	36147830	2SA1037KQ

Ref. No.	Part No.	Description
		TRANSISTORS (Continued)
Q260	36147830	2SA1037KQ
Q602	36147609	2SC1740S
		(VCR3706NE/CE/SE/3716NE/
		CE/I/UK/4706NE/7156NE)
Q651	36147836	2SC3939SQR
Q701	36147830	2SA1037KQ
Q702	36144469	DTC144EK
Q703	36147831	2SA1298Y
Q705	36147830	2SA1037KQ
⚠ Q901	36147838	2SC4231Q
⚠ Q902	36147832	2SC3377Q
Q921	36147830	2SA1037KQ
Q922	36145507	2SC2412KQ
Q923	36147830	2SA1037KQ
Q950	36147835	2SD471KL
Q951	36144628	DTA144EK
Q952	36144480	DTC114EK
Q953	36147835	2SD471KL
Q954	36147835	2SD471KL
Q956	36144302	DTA114EK
Q957	36145507	2SC2412KQ
Q958	36144098	2S0468C
Q990	36147830	2SA1037KQ
Q2501	36147833	2SA933S
		(VCR3706NE/CE/SE/3716NE/
		CE/I/UK/4706NE/7156NE)
Q2601	36145252	DTA144ES
		(VCR3706NE/CE/SE/3716NE/
		CE/I/UK/4706NE/7156NE)
Q2602	36145227	DTC144ES
		(VCR3706NE/CE/SE/3716NE/
		CE/I/UK/4706NE/7156NE)
Q5801	36147830	2SA1037KQ
Q5802	36147830	2SA1037KQ
Q5803	36145507	2SC2412KQ
Q5804	36144628	DTA144EK
Q5901	36147830	2SA1037KQ
Q5903	36147830	2SA1037KQ
		(VCR3716NE/CE/I/UK)
Q5904	36144469	DTC144EK
		(VCR3706SE/3716NE/CE)
Q5905	36145507	2SC2412KQ
		(VCR3716NE/CE/UK)
Q6602	36144628	DTA144EK
		(VCR3716EP)
Q6604	36147834	2SD1306
		(VCR3716EP)
Q6605	36144469	DTC144EK
		(VCR3716EP)
		DIODES
D301	36562981	DAP202K
D540	36562889	1SS132
D701	36562889	1SS132
D702	36562889	1SS132
D703	36562889	1SS132

Ref. No.	Part No.	Description
		DIODES (Continued)
D704	36562889	1SS132
D705	36562889	1SS132
D706	36562889	1SS132
D707	36562889	1SS132
D708	36563773	Photodiode
D711	36563780	Reel Sensor
D712	36563780	Reel Sensor
D713	36563779	Mecha-posi Sensor
D714	36563779	Mecha-posi Sensor
D715	36562889	1SS132
D716	36562889	1SS132
D717	36562889	1SS132
D720	36562889	1SS132
⚠ D901	36563781	Diode Bridge
D902	36563801	Diode
⚠ D903	36563782	Diode
D904	36563783	Diode
D905	36562889	1SS132
D906	36563802	Zener Diode MTZJ3,0B
D921	36563771	FR103
D922	36563798	1SS147
D924	36563772	30DF2-FC
D925	36563785	Zener Diode
D926	36563789	RK34
D927	36563798	1SS147
D928	36563803	Zener Diode 6.2V 83
D929	36562889	1SS132
D930	36563799	Zener Diode MTZJ6,2A
D931	36562889	1SS132
D950	36563804	Zener Diode MTZJ10B
D951	36562889	1SS132
D953	36563799	Zener Diode MTZJ6,2A
D954	36563805	Zener Diode
D955	36563774	1A3-F
D956	36562889	1SS132
D960	36563774	1A3-F
D961	36562889	1A3-F
D2402	36562889	1SS132
D2501	36563796	Zener Diode 15V B1
		(VCR3716EP)
D2502	36563796	Zener Diode 15V B1
		(VCR3716EP)
D2503	36563796	Zener Diode 15V B1
D2504	36563796	Zener Diode 15V B1
D2603	36563796	Zener Diode 15V B1
D5001	36562889	1SS132
D5002	36562889	1SS132
D5003	36562889	1SS132
D5004	36562889	1SS132
D5005	36563797	Zener Diode MTZJ6,2A
D5901	36562889	1SS132
		(VCR3716NE/CE/I/EPUK)
D5902	36562889	1SS132
		(VCR3716NE/CE/I/EPUK)
D6801	36562889	1SS132
		(VCR3716EP)

Ref. No.	Part No.	Description
DIODES (Continued)		
D6802	36562889	1SS132 (VCR3716EP)
⚠ IC901	37717010	Photo Coupler FX 0005
Q707	36563775	Photodiode
Q708	36563775	Photodiode
PACKAGED CIRCUITS		
X501	44212280	Crystal 4.43 MHZ
X701	44212282	Crystal 10 MHZ
X702	44212283	Crystal 32.678 KHZ
X5902	44212286	Crystal
COILS AND TRANSFORMERS		
FL2401	45526894	Filter LA 0020
FL5001	45526895	Filter
L201	45434184	Coil 100µH
L202	45434185	Coil 47µH
L203	45434172	Coil 10µH (VCR3716NE/CE/I/EP/UK/ 4706NE/7156NE)
L205	45434180	Inductor 68µH
L206	45434186	Coil 2.7µH (VCR3706SE/3716NE/CE/I/ EP/UK/4706NE/7156NE)
L207	45434187	Inductor 56µH
L250	45434188	Coil 6.8µH
L251	45434189	Coil 22µH
L252	45434190	Inductor 82µH
L253	45434191	Inductor 68µH
L301	45434152	Coil 100µH
L302	45434152	Coil 100µH
L501	45434175	Coil 560µH
L503	45434183	Coil 2.7µH (VCR4706NE/7156NE)
L504	45434147	Coil 15µH
L505	45434192	Inductor 10µH
L506	45434193	Coil 39µH
L509	45434194	Inductor 150µH
L510	45434174	Coil 12µH
L511	45434151	Coil 68µH
L601	45434156	Coil 8200µH
L651	45434154	Coil 220µH
⚠ L901	45526702	Filter LF0227 (VCR4706NE/7156NE)
L922	45434158	Coil 10µH
L923	45434171	Coil 22µH
L1402	45434172	Coil 10µH
L1403	45434172	Coil 10µH (VCR3706NE/CE/3716NE/ CE/I/UK4706NE/7156NE)
L1403	45434148	Coil 10µH (VCR3706SE/3716EP)
L1404	45434172	Coil 10µH (VCR3706NE/CE/SE/3716EP)

Ref. No.	Part No.	Description
COILS AND TRANSFORMERS (Continued)		
L1404	45434148	Coil 10µH (VCR3716NE/CE/I/ 4706NE/7156NE)
L1801	45434179	Coil 8.2µH (VCR3706NE/CE/SE 3716NE/CE/UK)
L1802	45434179	Coil 8.2µH (VCR3706NE/CE/SE 3716NE/CE/UK)
L2001	45434195	Coil 120µH
L2002	45434173	Coil 47µH
L2003	45434185	Coil 47µH
L2004	45434193	Coil 39µH
L2005	45434196	Coil 68µH
L5901	45434178	Coil 5.6µH (VCR3716NE/CE/ I/EP/UK)
L5904	45434152	Coil 100µH
L5910	45434177	Coil 22µH (VCR3716NE/CE/I/ EP/UK)
L5913	45434176	Coil 68µH
L6604	45434137	Coil 3.3µH
L6605	45434137	Coil 3.3µH
L6606	45434137	Coil 3.3µH
L6610	45434137	Coil 3.3µH (VCR3716EP)
T651	45113544	OSC. Transformer
⚠ T901	45113548	Power Transformer
CAPACITORS		
C201		390p 50V S Chip
C202		680p 50V S Chip
C203		22p 50V S Chip (VCR3706SE/3716NE/CE/I/ EP/UK/4706NE/7156NE)
C203		27p 50V S Chip (VCR3706NE/CE)
C210		0.1 25V S Chip
C211		10p 50V S Chip
C212		0.47 50V Electrolytic
C213		0.001 S Chip
C214		0.22 50V Electrolytic
C215		100p 50V S Chip
C216		10p 50V S Chip
C217		1.0 50V Electrolytic
C218		0.01 50V S Chip
C219		0.022 S Chip
C220		3.3 50V Electrolytic
C221		0.047 50V S Chip
C222		0.1 25V S Chip
C223		3.3 50V Electrolytic
C224		2.2 50V Electrolytic
C225		10 16V Electrolytic
C226		0.47 50V Electrolytic
C227		10 16V Electrolytic (VCR3716EP)

Ref. No.	Part No.	Description
		CAPACITORS (Continued)
C228		0.22 50V Electrolytic
C229		0.1 50V Ceramic
C230		47 6.3V Electrolytic
C232		0.1 Ceramic (VCR3706SE/3716NE/CE/I/EP/UK/4706NE/7156NE)
C232		0.1 50V Ceramic (VCR3706NE/CE)
C233		0.1 Ceramic (VCR3706SE/3716NE/CE/I/EP/UK/4706NE/7156NE)
C233		0.1 50V Ceramic (VCR3706NE/CE)
C234		0.1 Ceramic
C235		10 16V Electrolytic
C236		0.1 50V Ceramic
C237		100p 50V S Chip
C238		4.7p S Chip
C239		56p 50V S Chip
C250		33p 50V S Chip
C253		82p 50V S Chip
C254		680p 50V S Chip
C255		68p 50V S Chip
C301		0.022 S Chip
C302		0.022 S Chip
C303		0.22 16V S Chip (VCR3716EP)
C303		0.1 25V S Chip (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
C304		0.1 50V Ceramic (VCR3716NE/CE/I/EP/UK)
C305		33p 50V S Chip
C306		33p 50V S Chip
C307		0.022 S Chip
C308		0.022 S Chip
C309		0.022 S Chip
C310		0.33 16V S Chip
C311		47 6.3V Electrolytic
C312		0.01 50V S Chip
C315		0.01 50V S Chip
C316		47 6.3V Electrolytic
C350		0.01 50V S Chip
C501		0.0033 S Chip
C503		0.01 50V S Chip
C504		47 6.3V Electrolytic
C505		0.047 50V S Chip
C506		0.1 Ceramic (VCR3706SE/3716NE/CE/I/EP/UK/4706NE/7156NE)
C506		0.1 50V Ceramic (VCR3706NE/CE)
C508		0.1 Ceramic (VCR3706SE/3716NE/CE/I/EP/UK/4706NE/7156NE)

Ref. No.	Part No.	Description
		CAPACITORS (Continued)
C508		0.1 50V Ceramic (VCR3706NE/CE)
C509		0.015 S Chip
C510		3.3 50V Electrolytic
C511		33p 50V S Chip
C512		0.1 Ceramic (VCR3706SE/3716NE/CE/I/EP/UK/4706NE/7156NE)
C512		0.1 50V Ceramic (VCR3706NE/CE)
C513		0.1 16V S Chip
C514		0.033 16V S Chip (VCR3706SE/3716NE/CE/I/EP/UK/4706NE/7156NE)
C515		0.1 16V S Chip
C516		4.7 50V Electrolytic
C517		18p S Chip
C520		0.47 50V Electrolytic
C521		0.022 S Chip
C523		10 16V Electrolytic
C522		0.1 25V S Chip
C525		0.01 50V S Chip
C526		68p 50V S Chip
C527		47p 50V S Chip
C528		56p 50V S Chip
C529		4.7 50V Electrolytic
C530		120p 50V S Chip
C531		1.0p 50V S Chip
C532		47p 50V S Chip
C533		47p 50V S Chip
C536		180p 50V S Chip
C537		0.01 50V S Chip
C562		27p 50V Ceramic
C590		0.1 Ceramic
C601		0.0015 Ceramic (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
C601		0.0015 Ceramic (VCR3716EP)
C602		82p 50V Ceramic
C603		3.3 50V S Chip (VCR3706NE/CE/SE/3716NE/I/EP/UK)
C604		10 16V Electrolytic (VCR3706NE/CE/SE/3716NE/I/EP/UK)
C605		0.012 Mylar
C606		0.0027 Ceramic (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
C606		0.0027 50V Ceramic (VCR3716EP)
C607		47 16V Electrolytic

Ref. No.	Part No.	Description
		CAPACITORS (Continued)
C608		0.1 50V Electrolytic (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
C609		0.1 50V Electrolytic (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
C610		22 16V Electrolytic
C611		10 16V Electrolytic (VCR3706NE/CE/SE/3716NE/ I/EP/UK)
C612		0.015 50V Mylar (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
C613		0.022 Mylar (VCR3716UK)
C618		10 16V Electrolytic (VCR3706NE/CE/SE/3716NE/ I/EP/UK)
C619		0.0082 S Chip (VCR3716EP)
C619		0.068 50V Mylar (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
C626		0.1 50V Electrolytic (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
C626		0.1 25V Electrolytic (VCR3716EP)
C651		0.1 Ceramic (VCR3706SE/3716NE/CE/I/ EP/UK/4706NE/7156NE)
C651		0.1 50V Ceramic (VCR3706NE/CE)
C652		47 16V Electrolytic
C653		0.1 Ceramic (VCR3706SE/3716NE/CE/I/ EP/UK/4706NE/7156NE)
C653		0.1 50V Ceramic (VCR3706NE/CE)
C654		0.1 Ceramic (VCR3706SE/3716NE/CE/I/ EP/UK/4706NE/7156NE)
C654		0.1 50V Ceramic (VCR3706NE/CE)
C655		0.0056 Mylar
C656		180p 50V S Chip
C701		0.01 50V S Chip
C702		0.001 50V S Chip
C703		1.0 50V Electrolytic
C704		0.01 50V S Chip
C705		0.1 25V S Chip
C706		1.0 10V S Chip
C707		0.001 50V S Chip
C708		22 6.3V Electrolytic
C709		22 16V Electrolytic

Ref. No.	Part No.	Description
		CAPACITORS (Continued)
C710		0.001 50V S Chip
C711		10 16V Electrolytic
C712		0.01 50V S Chip
C713		2.2 50V Electrolytic
C714		2.2 50V Electrolytic
C715		47 6.3V Electrolytic
C721		1 10V S Chip
C722		22p 50V S Chip
C723		18p 50V S Chip
C725		0.01 50V S Chip
C726		22p 50V S Chip
C727		22p 50V S Chip
C728		0.01 50V S Chip
C729		0.0047 S Chip
C730		33 6.3V Electrolytic
C731		0.01 50V S Chip
C732		0.01 50V S Chip
C733		0.0047 S Chip
C734		100 6.3V Electrolytic
C735		1.0 50V Electrolytic
C736		0.1 Ceramic (VCR3706SE/3716NE/CE/I/ EP/UK/4706NE/7156NE)
C736		0.01 50V Ceramic (VCR3706NE/CE)
C737		47p 50V S Chip
C738		47p 50V S Chip
C739		47p 50V S Chip
C740		0.1 Ceramic (VCR3706SE/3716NE/CE/I/ EP/UK/4706NE/7156NE)
C740		0.1 50V Ceramic (VCR3706NE/CE)
C741		0.1 Ceramic (VCR3706SE/3716NE/CE/I/ EP/UK/4706NE/7156NE)
C741		0.1 50V Ceramic (VCR3706NE/CE)
C742		0.1 Ceramic (VCR3706SE/3716NE/CE/I/ EP/UK/4706NE/7156NE)
C742		0.1 50V Ceramic (VCR3706NE/CE)
C743		1000 6.3V Electrolytic
C745		0.01 50V S Chip
C746		0.01 50V S Chip
C747		0.01 50V S Chip
C748		0.01 50V S Chip
C749		0.01 50V S Chip
C750		0.01 50V S Chip
C751		0.1 Ceramic (VCR3706SE/3716NE/CE/I/ EP/UK/4706NE/7156NE)
C751		0.1 50V Ceramic (VCR3706NE/CE)

Ref. No.	Part No.	Description
		CAPACITORS (Continued)
C752		0.01 Ceramic
C753		0.1 Ceramic (VCR3706SE/3716NE/CE/I/EP/UK/4706NE/7156NE)
C753		0.01 50V Ceramic (VCR3706NE/CE)
C754		22 6.3V Electrolytic
C755		0.001 50V S Chip
C756		0.1 50V Ceramic (VCR3716EP)
C757		0.1 25V S Chip
C758		0.01 50V S Chip
C759		0.001 50V S Chip
C760		22 25V Electrolytic
C761		0.01 50V S Chip
C762		0.01 25V S Chip
C763		0.1 25V S Chip
C764		0.001 50V S Chip
C765		0.33 Mylar
C767		220p 50V S Chip
C770		0.0047 S Chip
C813		22p 50V S Chip
⚠ C901	32619089	Metalised Capacitor (VCR3716CE/4706NE/7156NE)
C902	32619086	Ceramic
⚠ C907	32619085	Ceramic
⚠ C908	32619085	Ceramic
⚠ C909	32619073	47 400V Electrolytic
⚠ C910	32619088	10 100V Electrolytic
C911	32619074	Ceramic
⚠ C912	32619090	0.033 Metal
⚠ C913	32619094	0.022 Mylar
C914		0.047 Mylar
C915		0.0047 Mylar
C921		47 63V Electrolytic
C924		Electrolytic
C925		100 16V Electrolytic
C926		Electrolytic
C927		470 10V Electrolytic
C928		47 50V Electrolytic
C929		470 10V Electrolytic
C930		0.01 Mylar
C932	32619087	0.0022 Mylar
C934		1.0 50V Electrolytic
C935		0.1 25V S Chip
C937		0.001 S Chip (VCR3706NE/CE)
C936		0.1 25V S Chip
C950		1 50V Electrolytic
C951		10 16V Electrolytic
C954		10 16V Electrolytic
C956		10 16V Electrolytic
C957		10 16V Electrolytic
C958		10 16V Electrolytic

Ref. No.	Part No.	Description
		CAPACITORS (Continued)
C959		10 16V Electrolytic
C965		0.022 S Chip
C966		10 50V Electrolytic
C1402		10p 50V S Chip
C1403		10p 50V S Chip
C1404		10p 50V S Chip
C1405		10 16V Electrolytic
C1406		0.047 Ceramic (VCR3706SE/3716NE/CE/I/EP/UK/4706NE/7156NE)
C1406		0.01 50V Ceramic (VCR3706NE/CE)
C1407		47 16V Electrolytic
C1408		0.01 50V S Chip
C1409		10 16V Electrolytic
C1410		220 16V Electrolytic
C1411		0.1 Ceramic (VCR3706SE/3716NE/CE/I/EP/UK/4706NE/7156NE)
C1411		0.01 50V Ceramic (VCR3706NE/CE)
C1412		0.1 25V S Chip
C1416		0.018 50V Mylar (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
C1552		100 16V Electrolytic (VCR3716EP)
C1801		0.033 16V S Chip (VCR3706NE/CE/SE/3716NE/CE/UK)
C1802		2200pF 50V S Chip (VCR3706NE/CE/SE/3716NE/CE/UK)
C1803		0.033 16V S Chip (VCR3706NE/CE/SE/3716NE/CE/UK)
C1804		150p 50V Ceramic (VCR3706NE/CE/SE/3716NE/CE/UK)
C1805		0.1 16V S Chip (VCR3706NE/CE/SE/3716NE/CE/UK)
C1806		47 16V Electrolytic (VCR3706NE/CE/SE/3716NE/CE/UK)
C2001		1.0 50V Electrolytic
C2002		82p 50V S Chip
C2003		0.01 50V S Chip
C2004		0.01 50V S Chip
C2005		220p 50V S Chip
C2006		0.01 50V S Chip
C2007		47p 50V S Chip
C2008		0.01 50V S Chip
C2009		82p 50V S Chip
C2011		47 6.3V Electrolytic

Ref. No.	Part No.	Description
		CAPACITORS (Continued)
C2012		0.1 25V S Chip
C2203		33 16V Electrolytic (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
C2204		0.01 16V Ceramic (VCR3716EP)
C2208		0.01 50V S Chip
C2401		0.01 50V S Chip
C2402		47 6.3V Electrolytic
C2403		0.01 50V S Chip
C2404		1.0 50V Electrolytic
C2405		820p 50V S Chip
C2406		0.022 S Chip
C2407		0.047 Ceramic
C2408		10 16V Electrolytic
C2504		0.01 50V Ceramic (VCR3716EP)
C2506		10 16V Electrolytic (VCR3706NE/CE/SE/3716NE/CE/I/EP/UK)
C2507		470 6.3V Electrolytic
C2509		470 6.3V Electrolytic (VCR3716EP)
C2603		220 Electrolytic (VCR3716EP)
C2604		0.001 S Chip (VCR3716EP)
C2605		0.001 S Chip (VCR3716EP)
C4490		0.1 Ceramic (VCR3706SE/3716NE/CE/I/EP/UK/4706NE/7156NE)
C4490		0.01 50V Ceramic (VCR3706NE/CE)
C4492		47 16V Electrolytic
C5001		0.1 Ceramic (VCR3706SE/3716NE/CE/I/EP/UK/4706NE/7156NE)
C5001		0.1 50V Ceramic (VCR3706NE/CE)
C5002		47 6.3V Electrolytic
C5003		0.01 50V Ceramic
C5004		47p 50V S Chip
C5005		0.1 Ceramic (VCR3706SE/3716NE/CE/I/EP/UK/4706NE/7156NE)
C5005		0.1 50V Ceramic (VCR3706NE/CE)
C5007		0.1 Ceramic (VCR3706SE/3716NE/CE/I/EP/UK/4706NE/7156NE)
C5007		0.1 50V Ceramic (VCR3706NE/CE)

Ref. No.	Part No.	Description
		CAPACITORS (Continued)
C5801		47 6.3V Electrolytic (VCR3706NE/CE/SE/3716NE/CE/I/4706NE/7156NE)
C5802		47 16V Electrolytic (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
C5803		47 16V Electrolytic (VCR4706NE/7156NE)
C5804		1000pF S Chip
C5805		120p 50V S Chip (VCR3716NE/CE/I/EP)
C5806		0.01 50V S Chip (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
C5807		47 6.3V Electrolytic (VCR3706NE/CE/SE/3716NE/CE/I/4706NE/7156NE)
C5808		0.01 50V S Chip (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
C5901		0.01 Ceramic (VCR3706SE/3716NE/CE/I/EP/UK)
C5902	32619091	Trimmer
C5903		0.01 50V S Chip (VCR3716NE/CE/I/EP)
C5904		22p 50V S Chip (VCR3716NE/CE/I/EP/UK)
C5905		0.022 Mylar (VCR3716NE/CE/I)
C5906		1.0 10V S Chip (VCR3716NE/CE/I/EP/UK)
C5907		0.0068 Mylar
C5908		0.001 50V S Chip (VCR3716NE/CE/I/EP/UK)
C5909		0.47 50V Electrolytic
C5910		560p 50V Ceramic (VCR3716NE/CE/I/EP/UK)
C5911		47 16V Electrolytic
C5912		0.1 Ceramic (VCR3706SE/3716NE/CE/I/EP/UK/4706NE/7156NE)
C5912		0.01 50V Ceramic (VCR3706NE/CE)
C5920		22 10V Electrolytic (VCR3716NE/CE/I/EP/UK)
C5923		47 6.3V Electrolytic (VCR3716NE/CE/I/EP/UK/4706NE/7156NE)
C5925		10 10V Electrolytic (VCR3716NE/CE/I/EP/UK)
C5926		0.1 25V S Chip
C5930		18p S Chip
C5931		18p S Chip

Ref. No.	Part No.	Description
		CAPACITORS (Continued)
C5932		22p 50V S Chip (VCR3716NE/CE/I/EP/UK)
C5933		47p 50V S Chip (VCR3716NE/CE/I/EP/UK)
C5934		47p 50V S Chip (VCR3716NE/CE/I/EP/UK)
C5935		47p 50V S Chip (VCR3716NE/CE/I/EP/UK)
C5937		1.0 50V Electrolytic (VCR3706NE/CE/3716NE/ EP/UK)
C5938		47 6.3V Electrolytic (VCR3716NE/CE/I/EP/UK/ 4706NE/7156NE)
C5939		22p 50V S Chip (VCR3716NE/CE/I/EP/UK)
C6602		10p 50V S Chip
C6681		10 16V Electrolytic
C6682		10 16V Electrolytic (VCR3716EP)
C6683		10 16V Electrolytic
C6684		0.33 S Chip (VCR3716EP)
C6685		0.33 S Chip (VCR3716EP)
C6686		0.33 S Chip (VCR3716EP)
C6687		0.33 S Chip (VCR3716EP)
C6688		0.01 50V Ceramic (VCR3716EP)
C7701		47 16V Electrolytic
C7702		1.0 50V Electrolytic
C7703		Ceramic
C7704		0.1 25V S Chip
		RESISTORS
R166		1k S Chip (VCR3706NE/CE)
R201		680 1/8W Carbon (VCR3716EP)
R202		330 S Chip (VCR3706NE/CE/SE/3716NE/ I/EP/UK/4706NE/7156NE)
R203		22k S Chip
R204		22k S Chip
R205		390 S Chip
R206		390 S Chip
R207		1.8k S Chip
R208		1.8k S Chip
R211		0.0k S Chip
R212		560k S Chip (VCR3706SE/3716NE/ CE/I/UK/4706NE/7156NE)
R213		2.2k S Chip

Ref. No.	Part No.	Description
		RESISTORS (Continued)
R214		10k S Chip (VCR3706NE/CE)
R214		8.2k S Chip (VCR3706SE/3716NE/CE/ I/EP/UK/4706NE/7156NE)
R215		2.7k S Chip (VCR4706NE/7156NE)
R215		3.3k S Chip (VCR3706NE/CE/SE)
R217		1.0k S Chip
R218		0.0k S Chip
R219		1.2k S Chip
R220		1.5k S Chip
R221		0.0 1/8W S Chip
R226		1.5k S Chip
R228		1.0k 1/8W Carbon
R230		10k S Chip
R250		220 S Chip
R251		560k S Chip (VCR3706SE/3716NE/CE/I/ EP/UK/4706NE/7156NE)
R253		5.6k S Chip
R260		4.7k S Chip (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
R261		4.7k S Chip (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
R262		1.5k S Chip
R280		0.0 S Chip
R301		0.0 S Chip
R302		680 S Chip
R303		1.0k S Chip
R304		22k S Chip
R305		33k 1/8W Carbon (VCR3706NE/CE/SE/3716NE/ CE/I/EP/UK)
R306		150 S Chip
R307		10 S Chip
R340		S Chip
R350		680 S Chip
R352		10k S Chip
R353		15k S Chip (VCR3706SE/3716NE/CE/I/ EP/UK/4706NE/7156NE)
R353		8.2k S Chip (VCR3706NE/CE)
R354		33k S Chip
R355		6.8k S Chip
R380		0.0 1/8W Carbon
R501		680 S Chip
R502		820 S Chip
R506		10k S Chip
R507		10k S Chip
R508		1.2k S Chip

Ref. No.	Part No.	Description
		RESISTORS (Continued)
R510		27k S Chip
R513		1.0k S Chip
R514		0.0 S Chip
R515		1.0k S Chip
R517		2.2k S Chip
R567		0.0 1/8W Carbon
R576		560k S Chip (VCR3706NE/SE/3716NE/I/EP/UK/4706NE/7156NE)
R577		0.0 1/8W Carbon
R601		2.2M S Chip (VCR3716EP)
R602		33k 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
R603		220 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/UK)
R604		270k 63V S Chip (VCR3716EP)
R604		270k 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
R605		6.8k 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
R606		6.8k 1/8W Carbon (VCR3716UK)
R609		3.3k 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/I/EP/4706NE/7156NE)
R609		3.3k Carbon (VCR3716UK)
R610		2.2M 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
R613		33k 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
R614		6.8k 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
R615		47k 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/UK/4706NE/7156NE)
R615		47k Carbon (VCR3716EP/UK)
R616		15k Carbon (VCR3716EP)
R616		15K 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
R617		1.5k S Chip (VCR3716EP)
R617		1.5K 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
R618		18k 1/8W Carbon (VCR3716EP)
R618		18K 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
R619		470 1/8W Carbon
R624		56k S Chip (VCR3716EP)
R625		1k S Chip (VCR3716EP)
R625		100k 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
R626		820 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
R629		15k Carbon (VCR3716EP)
R629		15K 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
R630		10k 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
R630		10k S Chip (VCR3716EP)
R636		10k 1/8W Carbon
R637		10k 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
R638		5.6k 1/8W Carbon
R639		15k Carbon (VCR3716EP)
R639		15K 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
R651		470k 63V S Chip
R652		6.8k S Chip
R653	31517824	4.7 Fuse
R654		2.7k 1/8W Carbon
R655		27 S Chip
R701		6.8k Carbon
R702		5.6k S Chip
R703		1k S Chip
R704		1k S Chip
R705		220k S Chip
R706		1k S Chip
R707		10k S Chip
R708		10k S Chip
R712		22k 1/8W Carbon (VCR3716NE/CE/I/UK)

Ref. No.	Part No.	Description
		RESISTORS (Continued)
R714		100 1/8W Carbon (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
R715		1k S Chip
R716		18k S Chip
R717		39k S Chip
R718		82k S Chip
R719		15k S Chip
R720		1k 1/8W Carbon (VCR3716I)
R721		220k S Chip
R722		100k S Chip
R723		100k S Chip
R724		680k S Chip
R725		1k 1/8W Carbon (VCR3716EP)
R726		68k S Chip
R727		220k S Chip
R728		330k S Chip
R729		3.9k S Chip
R730		22k S Chip
R731		1k S Chip
R732		1k S Chip
R733		1k S Chip (VCR3706NE/CE)
R733		1k 1/8W Carbon (VCR3706SE/3716NE/CE/I/ EP/UK/4706NE/7156NE)
R734		1k 1/8W Carbon
R735		1k 1/8W Carbon
R736		1k 1/8W Carbon
R737		1k S Chip
R738		1k S Chip
R739		3.9k S Chip
R740		0.0 S Chip
R741		1k 1/8W Carbon
R742		1k 1/8W Carbon
R743		1k S Chip
R744		100 1/8W Carbon (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
R745		1k 1/8W Carbon
R746		1k S Chip
R747		S Chip
R748		10k S Chip
R749		150 S Chip
R750		220 1/8W Carbon
R751		150 S Chip
R752		220 1/8W Carbon
R753		12k 1/8W Carbon
R754		12k 1/8W Carbon (VCR3706SE/3716NE/CE/I/ EP/UK/4706NE/7156NE)
R755		0.0 S Chip
R756		150 1/4W Carbon
R757		100k S Chip

Ref. No.	Part No.	Description
		RESISTORS (Continued)
R758		270 1/8W Carbon
R759		100k S Chip
R760		270 1/8W Carbon
R761		22k S Chip
R762		22k S Chip
R764		1k 1/8W Carbon
R766		1k S Chip (VCR3706SE3716/NE/CE/I/ EP/UK/4706NE/7156NE)
R769		1.0k S Chip
R770		10k S Chip
R771		10k S Chip
R772		22k S Chip
R774		330k S Chip
R775		10k S Chip
R776		100k S Chip
R777		100k S Chip
R779		47k S Chip (VCR3706NE/CE/SE/3716NE/ CE/EP/UK4706NE/7156NE)
R780		1.2M S Chip
R781		22k S Chip
R782		10k S Chip
R784		2.7k S Chip
R786		1k 1/8W Carbon
R787		1k 1/8W Carbon
R788		1k 1/8W Carbon
R789		1k S Chip
R790		1k S Chip
R791		1k S Chip
R792		10k S Chip
R793		10k S Chip (VCR3706NE)
R794		1k S Chip
R799		470 S Chip
⚠ R901	31517825	1.0M 1/2W Carbon
⚠ R902	31517827	4.7k Wirewound
⚠ R903	31517826	6.8M 0/5W Carbon
⚠ R904	31517826	6.8M 0/5W Carbon
R905		220k Carbon
R906		220k Carbon
R907		56k 1/4W Carbon
⚠ R908	31517830	68k Metal Oxide
R909		47 1/2W Carbon
R910		470 1/4W Carbon
R911		47 1/2W Carbon
R921	31517836	0.47 Fuse Resistor
R922		4.7 1/2W Carbon
R927	31517834	10 Fuse Resistor
R931		220 1/8W Carbon
R932		10k S Chip (VCR3706CE/SE/3716NE/CE/ I/EP/UK4706NE/7156NE)
R933		220 1/8W Metal Oxide
R934		220 S Chip
R935		15k S Chip

Ref. No.	Part No.	Description
		RESISTORS (Continued)
R936		2.7k 1/8W Carbon
R937		2.7k 1/8W Carbon
R938		3.9k S Chip
R939		6.8k S Chip
R940		1k 1/8W Carbon
R941		3.9k S Chip
R950		5.6k S Chip
R951		33 S Chip
R952		27 1/8W Carbon
R953		33k S Chip
R954		0.56 1/8W Carbon
R955		0.56 1/8W Carbon
R958		5.6k S Chip
R959		33 S Chip
R960		220 1/4W Metal Oxide
R961		5.6k S Chip
R962		33 S Chip
R963		220 1/4W Metal Oxide
R965		22k 1/8W Carbon (VCR3016NE/CE/I/UK)
R971		1.0k 1/2W Carbon
R975		1.0k 1/2W Carbon
R981		10k S Chip
R982		10k S Chip
R985	31517836	Fuse Resistor
R991		2.2k S Chip
R992		4.7k S Chip
R994		0.0 S Chip (VCR3716NE/CE/I/EP/UK)
R1401		560k S Chip
R1402		100 S Chip
R1403		330k S Chip
R1406		0.0 S Chip
R1410		5.6k 1/8W Carbon (VCR3706NE/CE/SE/3716CE/I/4706NE/7156NE)
R1410		0.0 S Chip (VCR3716EP/UK)
R1411		0.0 S Chip
R1412		1.0k S Chip (VCR3706NE/CE/SE/3716NE/I/EP/UK/4706NER/7156NE)
R1801		1.2M S Chip (VCR3706NE/CE/SE/3716NE/CE/UK)
R1802		6.8k S Chip (VCR3706NE/CE/SE/3716NE/CE/EP/UK)
R1803		1.2M S Chip (VCR3706NE/CE/SE/3716NE/CE/UK)
R1804		6.8k S Chip (VCR3706NE/CE/SE/3716NE/CE/EP/UK)

Ref. No.	Part No.	Description
		RESISTORS (Continued)
R1805		1M S Chip (VCR3706NE/CE/SE/3716NE/CE/EP/UK)
R1806		2.2k S Chip (VCR3706NE/CE/SE/3716NE/CE/UK)
R1807		100k S Chip
R1810		220 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/EP/UK)
R1811		220 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/UK)
R1812		220 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/UK)
R2001		1k S Chip
R2002		1k S Chip
R2003		1M S Chip
R2004		220 1/8W Carbon
R2005		2.7k S Chip
R2006		5.6k S Chip
R2007		S Chip
R2008		100 S Chip
R2009		1.5k Carbon (VCR3716UK)
R2009		1.2k S Chip (VCR3706NE/CE/SE/3716NE/CE/I/EP/4706NE/7156NE)
R2010		1.8k S Chip
R2011		560k S Chip (VCR3706SE/3716NE/CE/I/EP/UK/4706NE/7156NE)
R2012		470 S Chip
R2401		3.9k S Chip
R2402		560k S Chip
R2403		150 S Chip
R2407		2.7k S Chip
R2408		8.2k S Chip
R2409		680k S Chip
R2501		330 1/4W Carbon (VCR3716EP)
R2502		1200k 1/4W Carbon (VCR3716EP)
R2503		100 S Chip (VCR3716EP)
R2504		100 S Chip (VCR3716EP)
R2505		330 1/4W Carbon
R2506		75 S Chip (VCR3716EP)
R2507		100 S Chip (VCR3716EP)
R2508		75 S Chip (VCR3716EP)

Ref. No.	Part No.	Description
		RESISTORS (Continued)
R2509		75 S Chip (VCR3716EP)
R2509		75k 1/8W Carbon (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
R2510		100 S Chip (VCR3716EP)
R2510		100 1/8W Carbon (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
R2511		75 S Chip (VCR3716EP)
R2511		75 1/8W Carbon (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
R2513		22k Carbon (VCR3716EP)
R2515		10k S Chip (VCR3716EP)
R2516		10k S Chip (VCR3716EP)
R2517		10k S Chip (VCR3716EP)
R2518		10k S Chip (VCR3716EP)
R2520		22k Carbon (VCR3716EP)
R2521		22k Carbon (VCR3716EP)
R2522		22k Carbon (VCR3716EP)
R2523		10k S Chip (VCR3716EP)
R2541		100 S Chip (VCR3716EP)
R2544		S Chip (VCR3716EP)
R2545		390 1/8W Carbon (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
R2548		S Chip (VCR3716EP)
R2549		22k Carbon (VCR3716EP)
R2601		820 1/4W Carbon
R2609		47k 1/8W Carbon
R2609		47k Carbon (VCR3716I)
R2611		15k Carbon (VCR3716EP)
R2612		18k Carbon (VCR3716EP)
R2613		10k S Chip (VCR3716EP)
R2614		100 S Chip (VCR3716EP)

Ref. No.	Part No.	Description
		RESISTORS (Continued)
R5001		100k S Chip
R5002		100k S Chip
R5003		100k S Chip
R5004		100k S Chip
R5005		100k S Chip
R5006		1.0k 1/8W Carbon
R5007		10k 1/2W Carbon
R5008		27k 1/8W Carbon
R5010		1k 1/8W Carbon (VCR3706NE/SE/3716I/EP/ 4706NE/7156NE)
R5801		10k S Chip (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
R5802		10k S Chip (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
R5803		2.2k 1/8W S Chip (VCR3716NE/CE/UK)
R5803		2.2k S Chip (VCR3706NE/CE/SE/4706NE/ 7156NE)
R5804		2.2k S Chip (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
R5805		10k S Chip (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
R5806		10k S Chip (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
R5807		820k S Chip
R5808		560k S Chip (VCR3706NE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
R5809	31129688	VR (VCR3716NE/CE/UK)
R5809	31129689	VR (VCR4706NE/7156NE)
R5810		100k S Chip (VCR3706NE/CE/SE/ 4706NE/7156NE)
R5810		47k Carbon (VCR3716NE/CE/I/UK)
R5811		3.3k S Chip
R5812		2.2k S Chip (VCR3706NE/CE/SE/3716NE/ CE/I/UK/4706NE/7156NE)
R5813		3.3k S Chip
R5814		1.8k S Chip (VCR4706NE/7156NE)
R5814		2.2k S Chip (VCR3716NE/CE/I/UK)
R5815		56k S Chip

Ref. No.	Part No.	Description
		RESISTORS (Continued)
R5816		6.8k 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
R5817		220 S Chip (VCR3716NE/CE/EP/UK)
R5901		1.0k S Chip (VCR3716CE/I/EP/UK)
R5902		10k S Chip (VCR3716NE/CE/I/EP/UK)
R5903		1.5k Carbon (VCR3716NE/CE/I/EP/UK)
R5904		1.0k 1/8W Carbon (VCR3716NE/CE/I/EP/UK)
R5905		56k S Chip (VCR3706NE/CE/SE3716NE/CEI/EP)
R5908		47k 1/8W Carbon (VCR3716NE/CE/I/)
R5909		22k 1/8W Carbon (VCR3716NE/CE/I/EP/UK)
R5910		470 1/8W Carbon (VCR3706NE/CE/SE3716NE/CEI/UK)
R5911		S Chip (VCR3716EP)
R5921		39k S Chip (VCR3716NE/CE/I/EP/UK)
R5922		10k S Chip (VCR3716NE/CE/I/EP/UK)
R5923		47k S Chip (VCR3716NE/CE/I/EP/UK)
R5924		1.0k S Chip (VCR3716NE/CE/I/EP/UK)
R5925		180 S Chip (VCR3716NE/CE/I/EP/UK)
R5931		560 1/8W Carbon (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
R5963		390 S Chip
R5991		S Chip (VCR3706NE/CE/SE/3176EP)
R5992		S Chip (VCR3706NE/CE/SE/4706NE/7156NE)
R5994		S Chip (VCR3706NE/CE/SE/3716EP/4706NE/7156NE)
R5994		180 1/8W Carbon (VCR3716EP)
R6612		820k S Chip (VCR3716EP)
R6617		2.2k S Chip (VCR3716EP)
R6618		1k S Chip (VCR3716EP)

Ref. No.	Part No.	Description
		RESISTORS (Continued)
R6618		1.0k 1/8W Carbon (VCR3706NE/CE/SE/3716NE/I/UK/4706NE/7156NE)
R6619		22k 1/8W Carbon (VCR3706NE/CE/SE/3716NE/I/UK/4706NE/7156NE)
R6620		1.2k 1/8W Carbon
R6623		22k 1/8W Carbon (VCR3706CE/SE/3716NE/I/UK/4706NE/7156NE)
R6624		150k Carbon (VCR3716EP)
R6650		820k S Chip (VCR3716EP)
R6650		820 1/8W Carbon (VCR3706NE/CE/SE/3716NE/I/UK/4706NE/7156NE)
R6803		0.0 S Chip (VCR3706NE/CE/SE/3716NE/CE/I/UK/4706NE/7156NE)
R6804		S Chip (VCR3716EP)
R6805		S Chip (VCR3706NE/CE)
R6806		S Chip (VCR3716EP)
R6817		4.7k S Chip (VCR3716EP)
R6992		S Chip (VCR3706NE/CE/SE/3176EP)
R7701	31517837	2.2 Fuse Resistor
R7702		10k 1/8W Carbon
R7703		10k 1/8W Carbon
RJ1		S Chip (VCR3716CE/I/UK/4706NE/7156NE)
RJ3		S Chip (VCR3716CE/I/UK/4706NE/7156NE)
RJ11		S Chip (VCR3716CE/I/UK/4706NE/7156NE)
RJ12		S Chip (VCR3716CE/I/UK/4706NE/7156NE)
RJ13		S Chip (VCR4706NE/7156NE)
RJ22		S Chip (VCR3716CE/I/UK)
RJ28		S Chip (VCR3716CE/I/UK/4706NE/7156NE)

MISCELLANEOUS PARTS

⚠	41314365	AC Cord

Ref. No.	Part No.	Description
MISCELLANEOUS PARTS (Continued)		
⚠	41314364	AC Cord (VCR3716UK only)
CN1501	41314366	Tun-Conv Cable
DG5001	36861179	Digitron
⚠ F901	43752108	Fuse, T2AH/250V
FB701		Balun
FB2201		Balun (VCR3706NE/CE/SE/3716NE/I/EP/UK/4706NE/7156NE)
FB2501		Balun
FB2502		Balun (VCR3716EP)
FB6301		Balun
FB6302		Balun
⚠ FH901	43752146	Fuse Holder
⚠ FH902	43752147	Fuse Holder
P501		Plug, 3pin (AO)
P701		Plug, 6pin (AO)
P702		Plug, 2pin (AL)
P703		Plug, 9pin (AO)
⚠ P901	41314353	Plug, 2pin (PA)
P5001		Plug, 2pin (AO)
P6801		Plug, 5pin (AO) (VCR4706NE/7156NE)
P6802		Plug, 14pin (AO)
P6805		Plug, 2pin (AO)
RMC5501	69134748	Remote Receiver
S701	41127607	Switch, Rec
S5001	41127612	Switch, Standby
S5002	41127612	Switch, Ch +
S5003	41127612	Switch, Ch -
S5004	41127612	Switch, Int
S5005	41127612	Switch, Test
SC301		Socket, 4pin (AH)
SC701		Socket, 7pin (AD)
SC2501		Socket, RGB
SC2502		Socket, RGB (VCR3716EP)
SC6301		Wire Harness (VCR4706NE/7156NE)
SC6302		Socket, 14pin (AD)
SC6802		Socket, 8pin (AD)
TP1501		Plug, 4pin (AO)
TP5801		Plug, 2pin (AO)

—— End of Main ——

Ref. No.	Part No.	Description
OPERATION UNIT		
SC8801		Socket, 6pin (OA)
S8801	41127613	Switch, Stop/Eject
S8802	41127613	Switch, PLAY
S8803	41127613	Switch, REC
S8804	41127613	Switch, Pause/Still (VCR3716EP)
S8805	41127613	Switch, Ch +
S8806	41127613	Switch, Ch –

—— End of Operation ——

MECHANISM CHASSIS PARTS

Ref. No.	Part No.	Description
1		Main Chassis Ass'y
2		Supply Impedance Roller
3		Supply Impedance Roller Cap
4	75383478	Supply Impedance Roller Lower Frange
5	75383479	Supply Impedance Roller Inner
6	86817304	Supply Pole Base Ass'y
7	86817305	Take-Up Pole Base Ass'y
8	75384916	Guide Roller
9	83186180	Reverse Guide Lever Ass'y
10	73584917	Reverse Guide Spring
11	73584918	Reverse Guide Spacer
12	43359496	Audio/Control Head
13	83186171	Audio/Control Head Arm
14	73584919	Audio/Control Head Arm Spring
15	73584920	Azimuth Spring
16	43359497	Full Erase Head
17	83186170	Audio/Control Head Arm Spacer
18		Audio/Control Head PWB
19		Socket, 8 pin
20	76184353	Reel Belt
21	75383480	Pinch Roller Lever Ass'y
22	86817306	Pinch Double Action Lever
23	75383481	Pinch Drive Lever Ass'y
24	86817307	Pinch Drive Cam
25	83186172	Open Lever
26	73584921	Pinch Double Action Spring
28	83186173	Tension Arm Ass'y
29	83186174	Tension Arm Boss
30	73584923	Tension Spring
31	86817308	Tension Band Ass'y
32	75251442	Tension Pole Adjust Cam
33	86817309	Master Cam
34		Motor Pulley
35	86817348	Worm Gear
36	86817312	Worm Wheel Gear
37	75251443	Relay Gear
38		Loading Motor Block
40	75251444	Shifter
41	86817313	Shifter Drive Lever Ass'y
42	86817314	Take-Up Loading Gear
43	83186181	Take-Up Loading Arm Ass'y
44	75251445	Supply Loading Gear
45	83186182	Supply Loading Arm Ass'y
46		Auto Head Cleaner Ass'y

MECHANISM CHASSIS (Continued)

Ref. No.	Part No.	Description
47	73584924	Loading Double Action Spring
48	75484283	Reel Disk
49	75484284	Reel Idler
50	83186184	Clutch Lever
51	75383482	Clutch Gear Ass'y
52	75484285	Reel Pulley Ass'y
53	75251446	Playback Gear
54	83186176	Clutch Connect Arm
55	86817351	Take-Up Main Brake Ass'y
56	86817316	Take-Up Lock Lever
57	86817352	Supply Main Brake Lever Ass'y
58	73584925	Main Brake Spring
59	75251447	Cassette Housing Control Drive Gear
60	75251448	Light Guide
61	83186185	Slow Brake Ass'y
62		Slow Brake Spring
63	44329415	Capstan Motor
64	44329416	Loading Motor
65	41314352	Lead Wire for Loading Motor
66	41314349	FFC for Audio/Control
67	41314363	FFC for Drum Motor
70	86817319	Drum Base
71		Drum Base Mounting Screw (SW3P+8S)
72	86817320	Drum Earth Brush
73	73584927	Drum Earth Brush Spring
74	44329419	Drum Drive Motor
75		Drum Drive Motor Mounting Screw (SW2.6P+6S)
76	43359501	Upper and lower drum Ass'y (VCR3706NE/CE/SE/3716NE/CE/EP/I/4706NE/7156NE)
76	43359502	Upper and lower drum Ass'y (VCR3716UK)

End of Mechanism Chassis Parts

Ref. No.	Part No.	Description	
CASSETTE HOUSING CONTROL PARTS			
300	83186194	Cassette Housing Control Ass'y	
301	86817323	Slide Holder (L)	
302	86817324	Slide Holder (R)	
303	86817347	Drive Angle	
304	83186188	Double Action Rack	
305	73584928	Double Action Spring	
306		Slider	
307	86817325	Holder (L)	
308	83186189	Proof Lever (L)	
309	73584929	Proof Lever (L) Spring	
310	86817326	Holder (R)	
311	73584930	Cassette Spring	
312	83186190	Proof Lever (R)	
313	73584931	Proof Lever (R) Spring	
314		Drive Gear (L)	
316		Drive Gear (R)	AD
317	73584933	Drive Gear (R) Spring	
318	75251449	Synchro Gear	
319	75251450	Main Shaft	
320	86817345	Upper Plate	
321	86817328	Door Open Lever	
322	83186177	Sensor Lever	
323	73584934	Sensor Lever Spring	
324		C3P+8S (for Cassette Housing Control)	

— End of Cassette Housing Control Parts —

Ref. No.	Part No.	Description
SCREWS, NUTS AND WASHERS		
200		Set Screw
201		Audio/Control Head Screw
202		Tilt Adjusting Screw
203		Azimuth Adjusting Screw (2.6P+6S)
204		Screw, C2.6P+8S (For FE Head)
206		Screw, SW3P+5S (For Loading Motor Block)
207		Screw, C2.6P+7S (For Capstan Motor)
208		Screw, C2.6P+6S (For Loading Motor Angle Ass'y)
209		Screw, C3P+8S (For Drum Base)
210		X-Position Adjusting Nut
211	86817321	Reverse Guide Adjusting Nut
212		Audio/Control Head Adjusting Nut (M4)
214		Washer, W5.2P-11-0.5 (Reel Height Adj.)
215		Washer, W5.2P-11-0.3 (Reel Height Adj.)
216		Washer, W5.2P-11-0.4 (Reel Height Adj.)
217		Washer, W5.2P-11-0.6
218		Washer, W5.2P-11-0.7
219		Washer, W3.1-7-0.25
220		Cut Washer, CW4.5P-10-0.5
221		Cut Washer, CW2.6P-5.4-0.5
222		Cut Washer, CW2.6P-6-0.5
223		E-Ring, E-4
229		Screw, C3P+4S (For Slow Brake Spring)

— End of Screws, Nuts and Washers —

MECHANICAL PARTS

Ref. No.	Part No.	Description
601		Main Frame Ass'y
601-1		Main Frame
601-2	62734066	Foot Felt
602		Antenna Terminal Cover
603	61355218	Top Cabinet (VCR3706NE/CE/SE/3716NE/CE/I/EP/UK)
603	61355218	Top Cabinet (VCR4706NE/7156NE)
604		Bottom Plate
605		Toe Cabinet Fixing Angle (R)
606	86817346	Top Cabinet Fixing Angle (L)
607		H/A Shield
608		Spacer
609		Screw
610		Screw
611		Screw
612		Screw
613		Screw
614		Screw
615		Spacer
616		Screw
618		Spacer

End of Mechanical Parts

FRONT PANEL PARTS

Ref. No.	Part No.	Description
501	64183492	Front Panel Ass'y (VCR3716NE/CE/I/EP)
501	64183493	Front Panel Ass'y (VCR3716UK)
501	64183494	Front Panel Ass'y (VCR3706NE/CE/SE)
501	64184211	Front Panel Ass'y (VCR4706NE)
501	64184213	Front Panel Ass'y (VCR7156NE)
501-1	64183495	Front Panel (VCR3716NE/CE/I/EP/UK)
501-1	64183496	Front Panel (VCR3706NE/CE/SE)
501-1	64184210	Front Panel (VCR4706NE)
501-1	64184212	Front Panel (VCR7156NE)
501-2	86817344	Badge, "NOKIA" (VCR3706NE/CE/SE/3716NE/CE/I/EP/UK)
501-3	64660262	Cassette Flap (VCR3706NE/CE/SE/3716NE/CE/I/EP/UK)
501-3	64660273	Cassette Flap (VCR4706NE/7156NE)
501-4	63280481	Front Decoration Window (VCR3706NE/CE/SE/3716NE/CE/I/EP/UK)
501-4	63280487	Front Decoration Window (VCR4706NE/7156NE)
501-5	63280478	Button, Operate
501-6	63280479	Button, Channel/Rec
501-7		Button, Channel Set
501-8	64660263	Cassette Spring
502		Dial
503	63280480	Button Ass'y
503-1		Button, Stop/Eject
503-2		Button, Pause/Still
503-3		Button Holder
503-4		Spring
503-5		Button, Play

End of Front Panel Parts

Ref. No.	Part No.	Description

SUPPLIED ACCESSORIES

ACCESSORIES

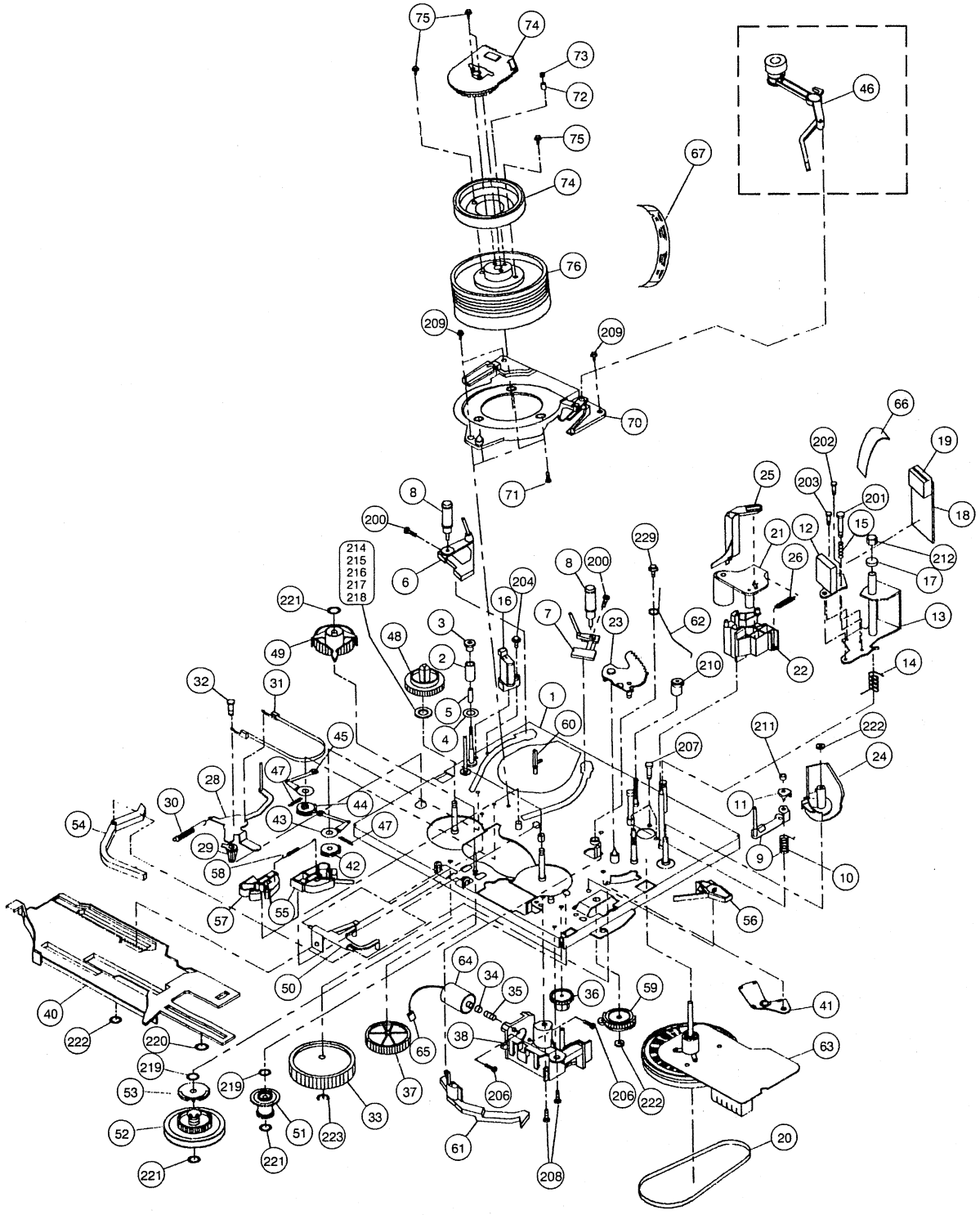
	41314245	75ohm Coaxial Cable
	56521918	Infrared Remote Control Unit (VCR3706NE/CE/SE 7156NE)
	56521912	Infrared Remote Control Unit (VCR3716NE/CE/I/EP)
	56521928	Infrared Remote Control Unit (VCR3716UK)
	56521931	Infrared Remote Control Unit (VCR4706NE)

ACCESORIES (NOT REPLACEMENT ITEM)

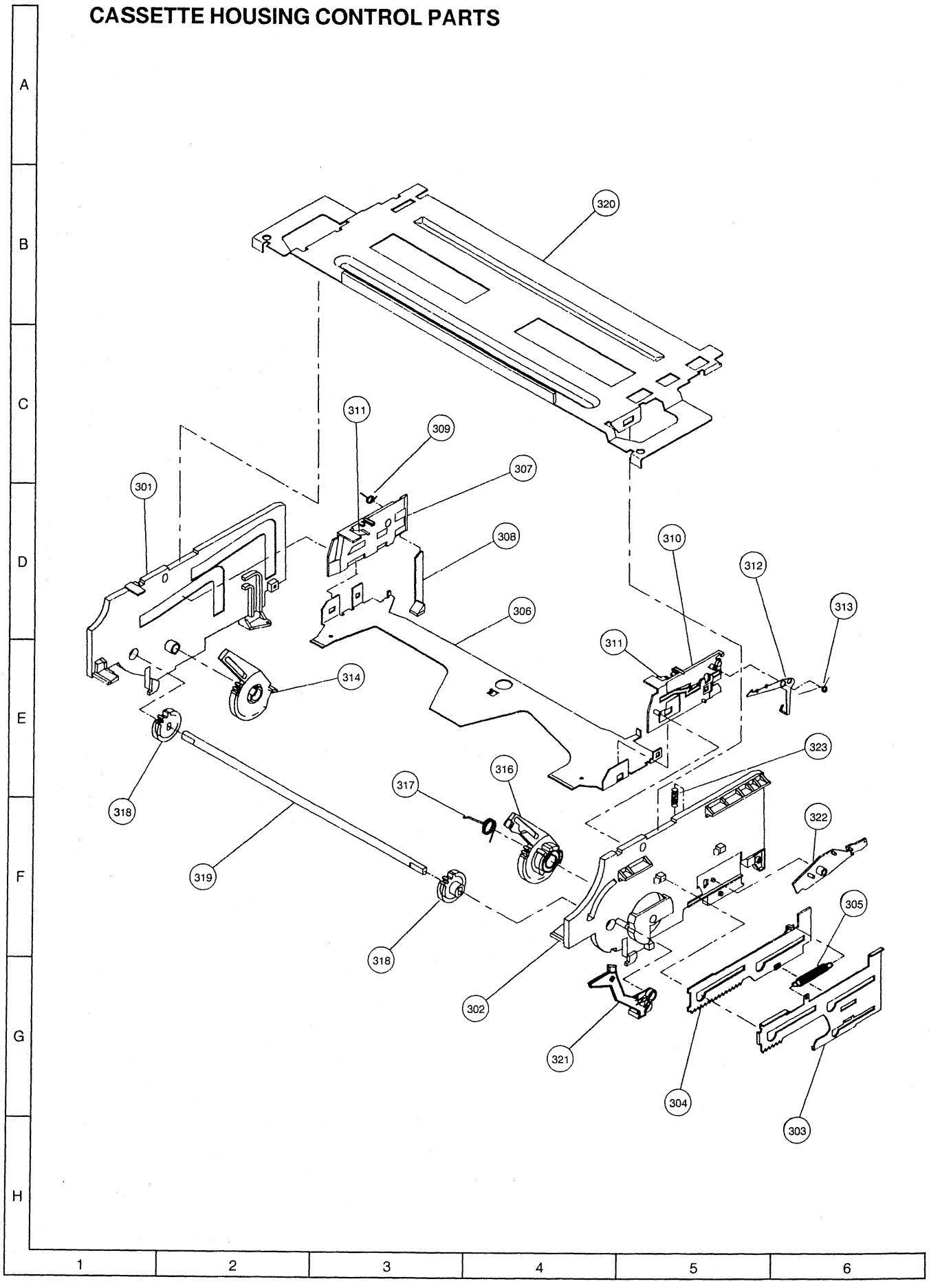
66127564	Operation Manual (VCR3706NE)
66127562	Operation Manual (VCR3706CE)
66127563	Operation Manual (VCR3706SE)
66127558	Operation Manual (VCR3716NE)
66127557	Operation Manual (VCR3716CE)
66127559	Operation Manual (VCR3716I)
66127560	Operation Manual (VCR3716EP)
66127561	Operation Manual (VCR3716UK)
66127801	Operation Manual (VCR4706NE)
66127802	Operation Manual (VCR7156NE)
61628955	Printed Packing Case (VCR3706NE)
61628953	Printed Packing Case (VCR3706CE)
61628954	Printed Packing Case (VCR3706SE)
61628950	Printed Packing Case (VCR3716NE)
61628948	Printed Packing Case (VCR3716CE)
61628951	Printed Packing Case (VCR3716I)
61628949	Printed Packing Case (VCR3716EP)
61628952	Printed Packing Case (VCR3716UK)
61628975	Printed Packing Case (VCR4706NE)
61628975	Printed Packing Case (VCR7156NE)

—— End of Supplied Accessories ——

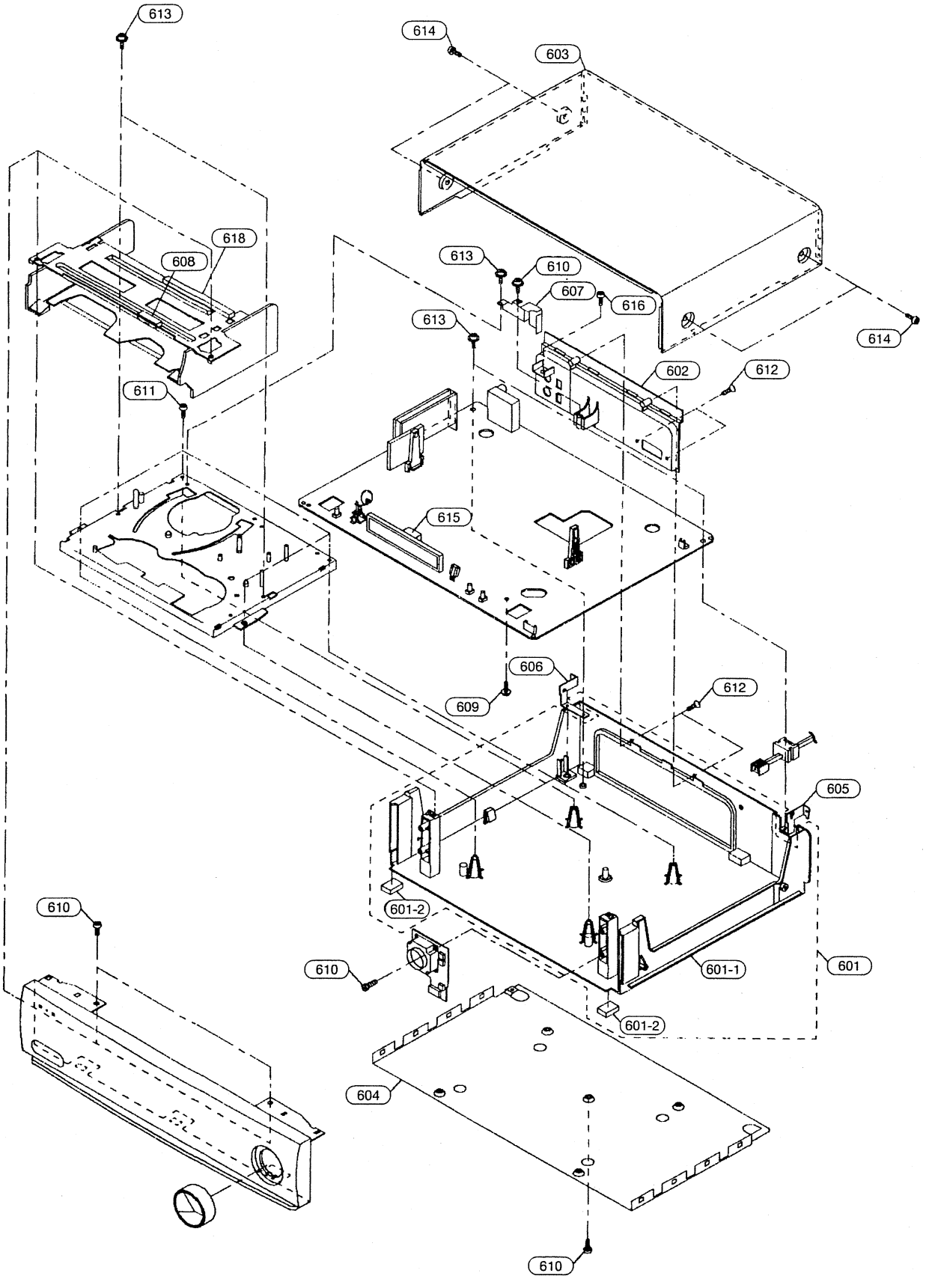
11. EXPLODED VIEWS/
MECHANISM CHASSIS PARTS



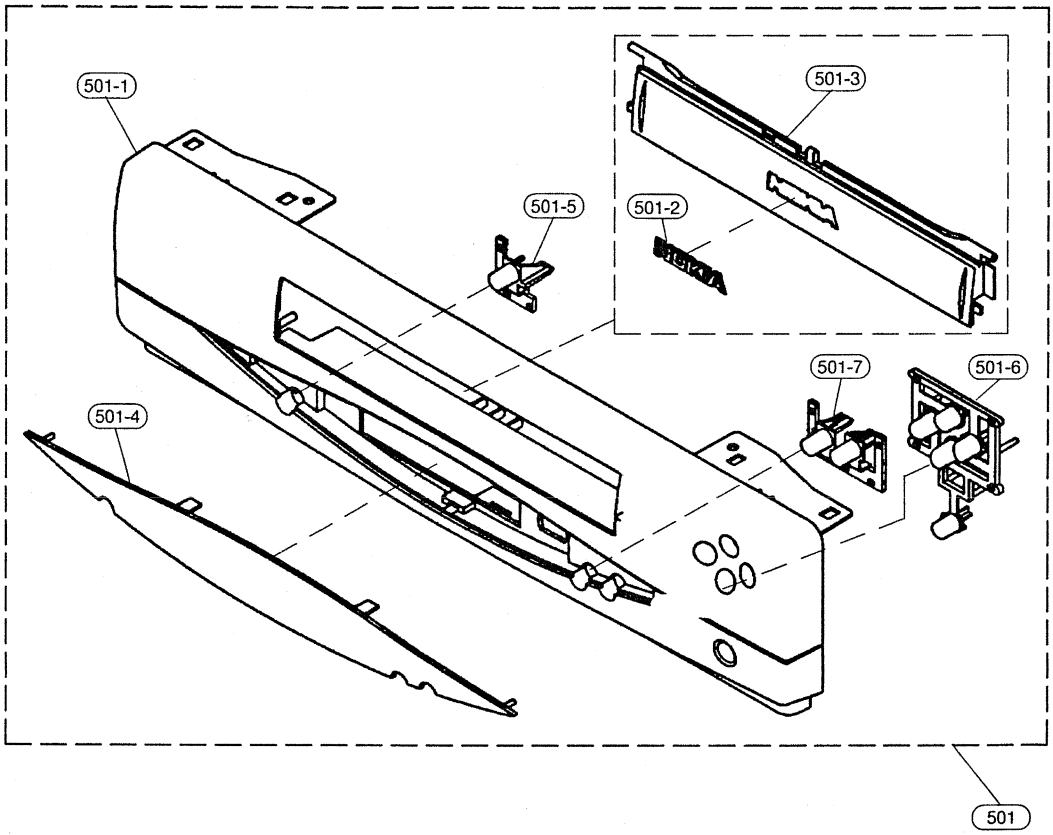
CASSETTE HOUSING CONTROL PARTS



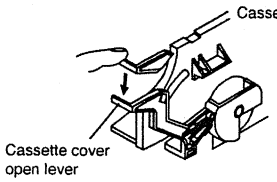
MECHANICAL PARTS



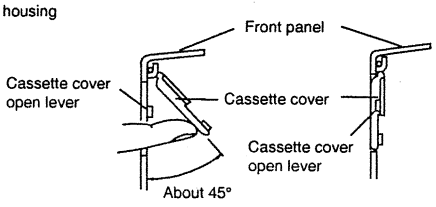
FRONT PANEL PARTS



PRECAUTION ON FRONT PANEL SET-UP

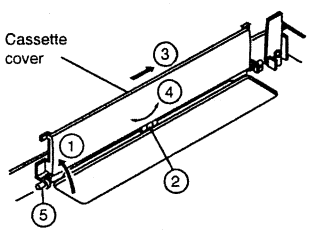


Before attaching the front panel in position, make sure that the cassette cover open lever is in its right place (lower-most). If it is out of position, push it down with a finger.



Keep the cassette cover about 45° open and make sure that the cassette cover open lever is between the front panel and the cassette cover. Now fix the front panel in place.

Do not mount the front panel with the cassette cover tilted too open. Otherwise the cassette cover might wrongly run on the cassette housing.



Removing the cassette compartment cover.

1 Open the cassette compartment cover fully.
2 Remove the center positioner.
3 Slide the cover to the right.
4 Slightly bend the cover.
5 Draw out the left-side rod.

12. PACKING OF THE SET

Setting position of the Knobs

RF Converter	at "E36" position
Test Signal	at "OFF" position

Accessories

♠ Operation manual
75 ohm coaxial cable
Battery